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Portable IBM 5100 Micro Packs in 64K, APL, Basic

By V. J. Farmer

Of the CW staff

ATLANTA—Microprocessing took a large-scale jump into the big time last week when IBM packed up to 64K bytes of main storage, a microprocessor and interpreters for both Basic and APL into a 50-lb table-top computer system.

Let there be no mistake, the IBM 5100 "Portable Computer" has set a new high as a super-sophisticated calculator and even as a terminal. It has a miniature CRT display, 1/4-in. tape cartridge, and optional matrix printer, IBM 2741-type interface and a backup tape cartridge drive. There is no disk capability, however, and IBM spokesmen clearly were sensitive at the 5100's unwillingness to reveal just how much real processing power this

microprocessor-based system has.

The firm was also careful to clarify that this unit, unlike most of the offerings from its General Systems Division, is not in the same league as the "Mom and Pop" System/32 and System/3.

The 5100 is a sophisticated "problem-solving" tool for sophisticated professionals in both the business and scientific community—no payroll, no accounts receivable and no industrywide applications packages.

Instead, there are three optional Problem Solver Libraries offering "walk-through" problem-solving modules in mathematics, statistics and business. Some of the business tasks, for example, include product profitability analysis, cost/volume profit determinations and cash flow analysis.

The spiffiest aspect of the machine is, however, the use of read-only storage (ROS) to handle system control and supervision as well as to store a VS Basic interpreter, about 50K bytes, and an APL shared variable interpreter in 108K bytes. The user can get either, or both, incorporated into his unit. Circuit densities of ROS are 48K bits per chip, according to IBM.

Single-Card Micro

A small single-card microprocessor is the basis of the 5100. The unit is a stored-program processor with data flow, register and I/O channel.

The microprocessor provides control of system I/O and general processing, according to IBM.

The small CRT screen can display 1,024 characters in 16 lines of up to 64 characters. (Continued on Page 3)



This model of the IBM 5100, which includes Basic and APL interpreters, is priced at \$19,975.

Univac Strategist Says

Plan Now for Next Software Generation

By Patrick Ward
Of the CW staff

NEW YORK—It's time to start planning for the arrival of fourth-generation software, Norman Weizer, Univac's director of software strategic planning, told Info 75 attendees here last week.

The average DP installation has its next two to three years of new applications projects already laid out, and "the last of these applications will be built with much more of the fourth-generation software than presently exists," he said.

"The first round of enhancements made on these applications may be almost completely done with the new generation of software," he added.

Manufacturers realize users have invested too much in present software to completely rewrite it for the new generations of machines, he said. Even so, some users may find at the last minute they will have to undertake massive software conversion efforts unless they take a few precautions in advance, he noted.

For one thing, users should program in

the standard, machine-independent languages "which will be easily and effectively carried into the next generation," he said.

Users should phase applications coded in Assembly language out of existence. "Since Assembly level languages are mir-

Info 75 coverage continues on Page 5.

rors of the current system architectures, they will not be supportable in native mode in the fourth generation," he said. While emulation will be an obvious possibility, it will also waste the capabilities of the new systems, Weizer said.

Fourth-generation machines will use higher level languages instead of Assembly level interface routines to handle data base, transaction and communications functions, he predicted.

"In addition, the efficiency of the compiler-generated code will be vastly increased so that time-dependent programs will not have to be Assembly coded," he said.

Comptroller Asks USDA to Halt \$100 Million DP Procurement

By Toni Wiseman
Of the CW staff

WASHINGTON, D.C.—The Comptroller General has recommended cancellation of a planned procurement of DP equipment for the U.S. Department of Agriculture (USDA) because "Agriculture [has] not developed the detailed plans or made the studies that should have preceded procurement."

The study leading to the report found that in implementing its objective to consolidate DP installations and to integrate its agencies' data systems, the USDA started procuring equipment before developing system plans or making the analytical studies which government policies and regulations require.

"As a result, there are unanswered questions concerning the number and location of sites, the DP equipment configurations, interfaces with communications equipment and the privacy and security considerations," the comptroller's report said.

The proposed system involved equipment estimated in excess of \$100 million, and total acquisition and operating expenditures over an eight-year period could ultimately cost some \$398 million, the report said.

In December 1970, a USDA staff study concluded USDA's DP resources were not being used effectively. The study identified 43 USDA computer systems in 26

(Continued on Page 2)

Also crucial for a smooth transition into the fourth generation is a data dictionary/directory containing "a definition of what the data is and exactly how it is used in every application," Weizer said.

Fourth-generation technology and distributed processing go together, Weizer indicated, and "if you distribute your data base you will have to know what applications will want what data."

Weizer also urged users to "stay away from changes to operating systems" as much as they can.

"Your supplier will undoubtedly at-

(Continued on Page 1)

Secret Service Files Prove 'Squeaky Clean'

By a CW Staff Writer

WASHINGTON, D.C.—Although the U.S. Secret Service maintains a computerized file on about 50,000 people considered potentially dangerous to the President, Lynette (Squeaky) Fromme wasn't in it. Fromme, arrested two weeks ago for an alleged assassination attempt against President Ford, was never under Secret Service surveillance, according to a White House spokesman. Secret Service spokesmen, however, refused to confirm this.

Fromme is a follower of Charles Manson, who was convicted for the murder of actress Sharon Tate and six other persons in August 1969.

Although Fromme is reputed to have an arrest record "as long as her arm," it was not clear what the dispositions were on some of the arrests, according to California Attorney General Evelle Younger, who said he "plans to find out."

"She has been a problem for law enforcement for a long time," he said. "I just hope she doesn't turn out to be on probation."

Secret Service officials have told Congress, in open committee hearings,

that the existence of the computerized file on persons believed to be dangerous to the President.

The names are divided into two groups, officials said. The first includes a few hundred persons considered to be serious threats.

Whenever the President is planning to visit a locale where a person on this list resides, local police are contacted to check on the person's activities.

Secret Service officials would not give reporters the criteria they use to decide whether to include a name on the second and longer list or say how that file is used.

It was reported that Fromme had made threats against President Ford as recently as July in interviews with the *Sacramento Bee* and United Press International's Los Angeles bureau.

The threats were described as "vague" and later President Ford to former President Richard Nixon, who Fromme blamed for Charles Manson's incarceration.



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Ade Hidenaka Sasaki

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Please address all correspondence to the appropriate department at 797 Washington St., Newton, Mass. 02160. Phone (617) 465-5300. Telex 92-25279.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 140-146 Camden Street, London NW1 9PH. Phone: (01) 485-2248/9. Telex: 264737. W. Germany: Computerworld, c/o Computec GmbH, 8000 München 40, Truderingstr. 11. Phone: 36-403/37. Telex: 5215350. Asia: Computerworld, c/o Dempco Computerworld Company, Dempco Building, 1-1-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-101. Telex: 26792.

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Board Chairman/Publisher Patrick J. McGovern
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Compton Keynote Asks Input

Goldwater Calls on DPer for Privacy Aid

By Monty Upton
Of the CW Staff

WASHINGTON, D.C. — Rep. Barry Goldwater Jr. (R-Calif.) has called on the computer science community to assist in the implementation of the Privacy Act of 1974 and future privacy legislation.

Congress "needs your input. We can make policy and laws, but you can make the mechanisms to implement them," he said in the keynote address at the 11th IEEE Computer Society conference (Compsoc) here last week.

"I ask you to volunteer to take it upon yourself to be committed to privacy and the concepts of privacy," Goldwater said. "Your familiarity with the technical

sides of the question are going to be called on to solve needs expressed by the Privacy Act of 1974," he declared.

The issue of personal privacy is a policy as well as technical matter, he said, adding, "I hope the Privacy Commission can call on computer scientists for technical input so laws will be reasonable" and recognize the economic and social effects, he said.

"Let's insert privacy rights into the programs of programmers," he said. "We must defend Big Brother."

A cosponsor of the Privacy Act of 1974 that affects the use of federal data files, Goldwater said he applauded those technical people who have stepped back from

computers to try to assess the impact of computers on society.

"We must stop and look again and see if all the new apparatus and methods are making us slaves to new masters," he said. "The threat is we're becoming slaves to technocracy."

Goldwater said he thinks American society started to lose direction in valuing the concept of privacy when it began placing too much importance on material possessions and the role of government.

The reliance on hardware helped Americans lose the sense of the true meaning of personal privacy, Goldwater said. "Now many wonder after we asked the government to do it for us," he added.

Comptroller Wants USDA to Cancel Procurement

(Continued from Page 1)

cities and 67 new computers planned for installation by 1975.

Recommendations resulting from that study suggested that management of all USDA DP resources be conducted by a central office, that an overall DP plan be developed and that large-scale regional computer centers with maximum use of terminals for remote use of the computers be implemented.

Areas of Concern

Following in the footsteps of several task forces, the consulting firm of American Management Systems, Inc. (AMS) was contracted in January 1974 to evaluate the organization and management of DP functions, existing DP operations in the light of user requirements and plans for consolidating DP resources, including communications requirements.

In May, AMS issued its final report, listing several areas of concern. These included the adequacy of USDA's planning and resources for conversion to the new equipment and the accuracy of the USDA's costing and sizing estimates.

AMS also expressed concern over the agency's procurement of too much computer power, its lack of specific computer center plans, its lack of detailed data on agency DP workloads and the capability of the Office of Automated Data Systems (ADS) to support the procurement from the viewpoint of organizational structure, technical expertise, planning and staffing. But after the AMS report, the "USDA did not develop the detailed plans or

make the studies that should have preceded the procurement actions," the Comptroller's report stated.

"The central office for the USDA-wide information system did not gather the information about management information requirements and agencies' computing and data communication needs," it said.

The DP requirements used to justify the request for proposals (RFP) released to industry in February 1974 were not representative of total USDA needs, the report added, because they were developed primarily from the workload analysis prepared by only one USDA agency—the Agricultural Stabilization and Conservation Service, one of the largest of the 29 user groups at USDA.

Made No Plans

While the Federal Property Management Regulations states that, under prescribed circumstances, data communications study should be made before a decision on the need for or type of DP equipment is reached, and the USDA's proposed system fulfilled that requirement, the USDA planned "to first acquire the large-scale DP equipment and then—sometime in the future—gather user requirements, design a network and integrate it with the DP equipment," the Comptroller's report said.

"Apparently USDA has not recognized that efficient and economical acquisition and use of a DP network is directly dependent on how the communications system is tailored to meet agency needs,"

it further stated.

The Comptroller also found USDA had not adequately considered the security precautions necessary to reasonably protect personal or other sensitive information from unauthorized access.

The RFP provided for user and file passwords, privileged instructions, hardware memory read/write protection and audit trails, but was not based on information on the most likely sources of threat to the data, safeguards available or the most cost-effective mix of security safeguards which would satisfy user needs, the Comptroller's report said.

After completion of the study, the Comptroller recommended that GSA cancel the planned procurement.

He further advised the Secretary of Agriculture to prepare a study, evaluation and integration plan for the proposed system and to complete the studies of USDA DP and communications requirements, network and configuration analysis, security and privacy requirements and economic factors.

After completion and comparative analysis of the plan and studies, select, if warranted, the best alternative and prepare a new RFP based on established requirements," the report recommended.

Correction

The 38th Annual Meeting of the American Society for Information Sciences (CW, Sept. 10) will be held Oct. 16-30 in Boston. For information contact Ruth Tapp, Nelinet, 40 Grove St., Wellesley, Mass. 02181.

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Portable IBM 5100 Micro Takes Maxi Leap With 64K

(Continued from Page 1)

ters. But because the screen is so small, IBM has added a switch to expand either the right- or left-hand side (32 characters) of the display across the full width of the screen.

IBM also thoughtfully added a TV monitor adapter so the user can attach a couple of larger CRTs for group display or for those users who want a larger display area.

IBM had 3M modify its 1/4-in. tape cartridge to provide the unit's mass storage medium.

The optional IBM 5103 printer operates bidirectionally at 80 char./sec. over 132 char./line.

The keyboard is set up with dual function keys for both APL and Basic when both are ordered together. There is also a calculator pad with 10 numeric, one decimal and four arithmetic function keys. The tape cartridge operates at 40 in./sec. in read, write, search and rewind speeds. This yields an effective read rate of 2,850 char./sec. and a write with checking rate of 950 char./sec. the firm added. In the communications mode, the 5100

appears the same as an IBM 2741 terminal, IBM said.

There are 12 models of the 5100 — four with Basic only, four with APL only and four with both APL and Basic.

Each series is available with 16K, 32K, 48K and 64K of main memory. A Basic-only 16K is priced at \$9,975; an APL/Basic 64K with communications is priced at \$19,975.

The Problem Solver Libraries are priced at \$500 each on a "one-time monthly charge." This means, according to an IBM spokesman, there is no way a user can actually purchase the libraries and they "remain the property of IBM" under a lease arrangement.

The IBM 5103 printer sells for \$3,675 and the 5106 auxiliary tape unit costs \$2,300.

Plan Now for Fourth Generation, Software Strategist Urges Info

(Continued from Page 1)

tempt to make as few changes to the user interfaces as possible," he said.

"However, it will be open season on the innards of these systems... If you have a code which is intimately involved with the innards, you will have to change this code for the fourth generation," he remarked.

One thing the user can do, Weizer said, is decide now which applications will remain essentially unchanged in the fourth-generation environment and which will probably have to be partly or completely redone.

Those applications that will have to be reworked can be either optimized for the user's present equipment or left as is if the user decides their remaining life span does not justify enhancing them.

Decisions on Vendors

Once the user has listed the applications he wants to see carried over onto fourth-generation gear, he must decide whether he wants to stay with his present major software suppliers, Weizer said.

If the user plans to stay with the same mainframe manufacturer, "it becomes very important to follow his lead," Weizer advised.

"All of the major mainframe manufacturers are showing their primary direction for fourth-generation software by their pattern of software announcements and enhancements," he noted.

"It is this 'primary direction' software which will be able to get the most out of the next generation of hardware," he said.

"Remain current on your operating system or start plans now for conversion to an operating system that will be supported in the fourth generation," Weizer urged attendees.

"You should never get more than one or two releases behind the manufacturers' current operating system release level. Many of the changes being put into current operating systems are in preparation for the conversion to the fourth generation," he said.

"If you remain current, you may have several minor conversion efforts which will be more of an annoyance rather than a problem. However, if you remain static for three or four years, you may find the conversion to the new generation will be very painful."

Users who don't want to stay with their present software vendor should try not to get themselves too locked into the vendor's software, Weizer added.

They should also "stay away from unique, extensive modifications to the operating system" and should not get tied into unique Cobol or Fortran features that only their current manufacturer's equipment supports.

For these users, the purchase of outside software packages which run on several manufacturers' equipment might prove to be economic in the long run, even if slightly more expensive in the short run, he noted.

Weizer offered some indications on what form he felt fourth-generation computer systems would take.

Sygen will probably vanish, and "current operating system functions may be spread across several hardware boxes," he said.

Users will be able to spread their processing load among several systems "as terminals and remote systems become more intelligent and as users and management demand more convenience and reliability," he forecast.

Cobol will remain the primary language for the next generation and, in fact, "the entire internal architectures of processors (hardware and firmware) are being optimized for high level language use."

"Widely improved" data base and data communications systems "will offer greater ease of use, more device independence, the ability to distribute and access one or more data bases on several geographically separated systems and greater data security and privacy."

There will also be greater use of independently produced software packages, with more turnkey, full-application packages for smaller systems, he said.

A push toward greater convenience in DP use will emphasize "distribution processing power and emphasis on on-line processing."

Fourth-generation systems will also aim at reducing the time and resources taken by application development and maintenance, he said.



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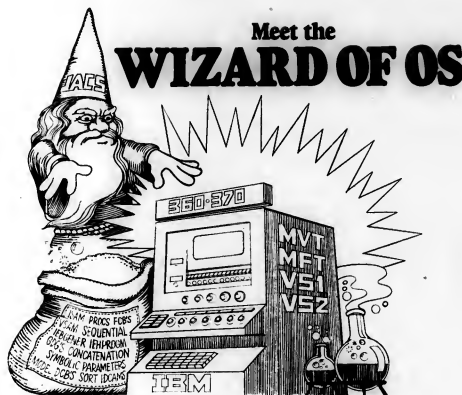
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"We'd rather specialize than generalize."

Xerox Cuts 300 Jobs, Leaves 'Undertakers'

EL SEGUNDO, Calif. — Although Xerox would not release any numbers last week, insiders estimate about 300 people got pink slips this month.

Most of the cuts were made in the sales operation, but the move will not hamper users' ability to communicate with the firm, a spokesman said.

The company "still has a functioning national sales force, including area managers, sales representatives and analysts," he said.

"Since we're not competing for new accounts, the workload and the selling effort have been substantially reduced," he explained.

Those people who remained will continue to be responsible for the installed user base, any customer add-ons and special programs such as OEM customers and users with special needs, he said.

The employees left after the cuts have dubbed themselves the "Undertaker Crew" — "those left to bury the body," one insider said.

In addition to sales personnel, individuals were also cut in functions such as public relations, product management and advanced development, sources said.

Even Bob Tyhurst, secretary of Exchange, the Xerox users' group, was replaced by his boss, Dennis Taylor, who had the job some years ago, Exchange President Bill McAlpin said.

Production workers were apparently saved from this reduction in force by the large backlog of orders placed by users after the firm's phase-out announcement [CW, July 30].

Sources saw the action as a means of streamlining the firm and making it more salable. On that score, Xerox is continuing "discussions" with a number of firms that "have expressed interest in all or part of the operation," the spokesman said.

Mail Contract Passes Despite Fears of DP

WASHINGTON, D.C. — Members of the National Association of Letter Carriers (NALC) have ratified a three-year contract with the U.S. Postal Service despite criticism from some members that the contract did not provide "adequate protection for the carriers" in the work standards and productivity area.

Presidents of a number of big city letter carrier locals had opposed ratification because they felt the contract offered too much leeway for the introduction of a computer to set letter carrier routes and direct other productivity-oriented measures.

The vote was 88,000 for the pact and 42,000 against, according to James H. Rademacher, president of NALC. The contract was "overwhelmingly adopted despite the most serious opposition I have ever seen," he said.

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The Only Show in Town

CW Photo Feature

By Vic Farmer

NEW YORK — It wasn't big... it wasn't small... some of the sessions were standing-in-the-hall-room only... and others had a majority of panmistia.

But it was the only show in town — it was Info 75.

On the exhibit floor, Honeywell showed up as a last-minute exhibitor. Terminal and software vendors abounded. And attendance was up over last year.

The total exhibit space was smaller than last year with a funny twist... last year's exhibitors with large booths took less space, last year's exhibitors with small booths took more space. And so the show came out just about equal to last year's in size.



Burroughs demonstrated its 1724, the largest mainframe it has shown anywhere in a long, long time.



It was a double take, as Southern Systems brought in a 360/30 from Time Brokers to demonstrate its new I/O subsystem right next to the small IBM booth.



Keydata celebrated its 10th anniversary.



Oldtimers remember when Sonny M. used to walk up and down the boardwalk with sandwich boards advertising his used equipment. This was his first show... inside.



Honeywell decided to exhibit three weeks ago and managed to sell its page printer right off the floor.



Panorama of Part of the Exhibit Floor

Users, DPs Must Set Goals to Realize Cost Savings

By Edith Holmes
of the CW staff

NEW YORK—Both users and systems people contribute to the inability of computerized information systems to realize the cost reductions they were installed to achieve, a consultant and a DP center director both told an audience at Info 75 here last week.

Having developed a payroll, personnel and budget system for an unnamed state university, Michael Aherne, vice-president of Integral Systems, Inc. in

Flemington, N.J., discussed the school's failure to achieve any savings because the user departments involved never defined explicit goals for doing so.

Joseph Navarro, associate director at the center for Computer and Management Sciences at Rutgers University, then talked in general about the reasons and rationales, opportunities and pitfalls in installing any new system from the viewpoint of systems and other DP personnel. Ten- to 16-hour days, six to

seven days a week, constituted "excessive overtime" for employees in payroll and personnel at the university, creating a morale problem as well, according to Aherne. "One motivation for installing the system was to quiet the discontent of that staff," he said.

Other reasons for the system were also developed: an information system would make compliance with federal requirements easier, and the school was heavily dependent on federal funds; an information system would

eliminate overpayments and unnecessary benefits while providing more adequate coverage in benefit areas previously neglected; an information system

CW at Info 75

would improve DP costs and services in all university projects.

No Intention to Save Money

But, Aherne noted, at no time were explicit goals developed beyond "shutting up some people and making a name for others. There was no intention to save money, so none was saved."

He added that no user department or individual took the need to reduce costs personally.

"The definition of the system function was out of control; the system was grandiose, designed to be everything to everybody; and, so, relative to its predecessor, it cost a lot more."

Abolishing his own firm from too much of the responsibility for this lack of system development objectives, Aherne said he arrived on the scene after the basic plan had been conceived and a six-month schedule of deadlines established for a project that deserved a development and implementation time of 18 months to two years. After talking with people in eight different user areas, the consultant said he discovered much of that time would have to be spent unloading the cart full of dreams for improvements the system would bring.

In retrospect, Aherne advised his audience never to be without explicit cost reduction goals and justifications and never to fail to meet the cost objectives set. Make sure the operating savings will account for the development costs in a reasonable amount of time, he added. Finally, he cautioned of the

need for "knowledgeable support" from at least some of the users involved.

From their point of view, Navarro said data processing people tend to offer user reasons for going with a new system that are often more pie-in-the-sky than real.

Arguments range from the system will require fewer maintenance and enhancing man-hours and will lower cost per transaction to people can be replaced by the machine, and costs will be further lowered by limiting the supplies, services and support needed, he noted.

While such goals are admirable, Navarro added that the "DP promises-to-performance ratio traditionally has not been very good." DP's need to be more realistic, he said.

User requirements are constantly evolving. For example, they will soon expand to fill the new system's capabilities, he cautioned.

"You do not eliminate personnel by bringing a system up," Navarro continued. "The elimination of a coding clerk out of a user shop may often mean the addition of another keypuncher to enter data at the computer center."

Navarro noted as well that the redundancy of output a user thinks he wants is not often what he needs. If considered, these factors could mean real savings in the areas of supplies, services and support, he said.

No matter how well user needs are understood, there are bound to be errors come design time, Navarro told the audience. DP people are the ones who must maintain standards.

But Navarro cautioned DP's must come up with realistic plans that will meet their needs, too. He suggested that, by being realistic from the outset, systems people will lessen the tendency to think of the project "as their child," above and beyond criticism.

Beware of Communications Pitfalls

By a CW Staff writer

NEW YORK—A geographically distributed operation and faster moving data are important benefits of telecommunications.

But such systems often consist of separate modem, carrier, computer and software companies which engage in multiple finger-pointing sessions whenever anything goes wrong, a consultant warned an Info 75 meeting here last week.

The reliability and efficiency of a telecommunications system requires either a low number of vendors or a tight managerial control, based on a high degree of technical expertise, according to Derwood G. Plyler, vice-president of The Computer Management Methods Co. At this stage of telecommunications technology, "users should consider service to their operation, rather than efficiency, the overriding concern in how the system is developed and implemented," he added.

Users do have a right to expect benefits from a well-conceived telecommunications system, he continued. Among those benefits are on-line programming which can reduce development time, the ability of the developing staff to "move" to the location needing assistance and computer-controlled programming standards which can result in more efficient code.

Yet Plyler went on to detail the potential

pitfalls of a telecommunications system. A user may put together a complicated hardware and software mix only to discover, in a few months, it no longer serves his needs.

For this reason, the consultant stressed the importance of conceiving and maintaining a "future plan" and measuring the performance of the system on a continual basis.

"Telecommunications tends to involve extreme costs," he said, adding users need to look for the hidden and unnecessary expenses.

He suggested, for example, while a hundred copies of a report might be nice, one is sufficient; while terminals may "look good," microfilm may be the best long-term solution to data storage; while "our office does it differently," the company has a standard procedure; and while "a secretary ought to be able to run that thing," terminal operation often requires some operator training.

Users may encounter additional difficulties, Plyler warned. Data in transit may pass through more than one carrier; the array and costs of services for moving data over lines constantly change; and the lowest bid equipment might not have sufficient maintenance support.

Once a telecommunications system has been developed, Plyler suggested the user make sure break-even points are in keeping with development costs and all sites are coordinated to ensure projected network cost benefits.

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Depends on Business' Complexity

Plan Matters More Than Time Frame in Five-Year Plan

NEW YORK — The number "five" in the phrase, "the five-year plan," is strictly an arbitrary figure.

The important word is "plan," R.C. Bartlett, corporate manager of information systems plans and controls for IBM Corp., told an Info 75 session here last week.

While the information system (IS) plan is a very important and necessary adjunct to effective IS, it is only one element of several which are required to ensure effective IS, Bartlett said.

"Also, it must be understood that the time frame covered by any plan is a variable of the business being planned," he said.

As IS activities expand and become more complex, they represent an increasing investment and importance to a business and, therefore, receive greater focus. This focus will result in policies and guidelines which form the framework for the IS management system, he said.

The elements of an IS management system include policies, instructions and guidelines; equipment justification; project control and accounting; and operational audits, Bartlett said. A phase review and audit of the key project is also necessary, as is performance monitoring and measurement.

"If, as I believe, each of these elements is an integral part of the management system and if a system, like a chain, is only as strong as its weakest link, then each part must be adequate to the need," Bartlett said.

Two Plan Cycles

The implementation of an IS management system can be expected to require at least two plan cycles before yielding a viable plan, he said.

The first step is to get management to establish its responsibility for the system and to ensure

its support.

"The second step is the planning and assessment process," Bartlett said. "When this is underway, you will be better

CW at Info 75

qualified to address the remaining elements," namely, key project identification, phase review and audit; operational audits; and productivity and value analyses.

An IS plan is a subset of the corporation's business plan which is itself divided into the "near in" operating plan which covers the next one or two years and the longer range strategic plan dealing with statements of goals and objectives, he continued.

What is the rationale for an IS plan? There are several reasons, Bartlett suggested, starting with the increasing dependency of organizations on information systems due to increasing business complexity. IBM, for instance, can no longer design or manufacture computers without the use of computers, he noted.

The impact of information systems on business decisions, product and technology dynamics and productivity improvement are further arguments for the implementation of an IS plan, he said.

The degree of formality reflected in an IS plan is a factor of the size of the organization, Bartlett said, but its purpose remains the same: to provide a uniform vehicle for stating plans to support the achievement of company objectives, to assure integration with the rest of the business' needs and to provide a base line for measurement.

"It is also a great vehicle for securing assessment and concurrence," he noted.

Key Projects Use IS

In IS plans, project-oriented information is usually limited to "key projects" which can be identified in terms of various characteristics such as size (\$1 million or more at IBM), time (at least two years), complexity,

number of locations involved and state of the art, Bartlett said.

"This essentially sets priorities for management focus, covers a few projects and a majority of the development resource and still leaves adequate discretionary resource for line management in the day-to-day operation of the business," he said.

An IS plan should not be done

in a vacuum, rather, to perform its purpose of supporting business and management, the IS organization must look in with the business plan and know what it will be doing in the future, Bartlett said.

"A final point is that new information systems are not redos, but are usually greatly expanded in terms of user function and availability," Bartlett concluded.

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Army Satisfied No Citizen Files Transferred to MIT

By a CW Staff Writer

WASHINGTON, D.C. — After investigating "all possible leads," the U.S. Army's Investigative Service found no proof that dissidents on Americans involved in civil disturbances were ever transferred by computer network to the Massachusetts Institute of Technology (MIT) as was charged in the news media last

June. D.O. Cooke, the Department of Defense (DOD) assistant secretary for administration, made this statement during a recent appearance before a combined Senate committee studying technology and surveillance. "We are at a loss to imagine why anyone would try to hide outdated data on civil dis-

turbances over five years old in the [Advanced Research Projects Agency's (Arpa)] unclassified computer network widely available to subscribers in the academic community," Cooke said. "If I discover any truth to these allegations, the Department of Defense will be the first to announce it and take appropriate corrective action," he

said.

Cooke also took the opportunity to "end confusion" over the functions of three "allegedly" secret, interlocking systems and thus end further speculation about these systems. According to Cooke, the most highly classified of the three is a network known as the Community On-Line Intelligence System (Comins).

Comins is a "secure system, connecting selected data banks of three intelligence agencies, including the Defense Intelligence Agency, the National Security Agency and the National Photo Interpretation Center."

The network is designed to permit the exchange of classified and highly sensitive foreign intelligence data among those agencies, the Central Intelligence Agency (CIA) and the Department of State, he said.

Upgrading Efficiency

Comins is designed for and used exclusively to share foreign intelligence data on such things as order of battle information and movements of foreign military units. Comins is presently being upgraded for purposes of efficiency, using the interface message processor (IMP) developed by Arpa. However, it is not and will not connect with the Arpa net itself, he said.

Comins contains no information on U.S. civilians and has never been used for Army civil disturbance information, he testified.

The Arpa network, Cooke explained, is an "unclassified computer network, now six years old, developed to enable many makes and models of computer mainframes and their terminals to communicate with one another.

With 86 mainframes in 56 locations throughout the country, the network is widely used by

members of the scientific and technological community.

Factual Error

NBC News made a significant factual error in a recent story about the so-called IMP when it said the IMP could "translate" the language of one computer to that of another, Cooke said.

"If it could do that, the computer community would be delighted, and its inventory would be very wealthy," he said.

In fact, the IMP is not a translator, but rather a switch that routes packets of information through communications lines "like railroad switches route trains through the rail network," he said.

As a result of the NBC broadcast, many people now think IMP can translate computer languages or even spy.

Switching enables subscribers to gain access to the "best" and "most available" computer in the network to study weather, speech processing, seismic data and many computer science developments.

Computerized Index

Cooke also mentioned the Defense Central Index of Investigations, a computerized index to investigative files maintained on all persons who are now or were previously affiliated with DOD, including military and civilian personnel and civilian contractors who required DOD security clearance to work on classified government contracts.

Remote terminals in six organizations may access the index, which contains name, date and place of birth, file number and file location.

Only law enforcement or government personnel security investigative units have access to the data in the index or the files located by the index, Cooke said.

USSR Theory Equals That of U.S., But Hardware Seen Less Advanced

By Toni Wieman
Of the CW Staff

NEW YORK — Computer theory in Russia may be as advanced as here, even if the USSR is less technically advanced in the hardware area, according to a recent visitor.

"The Russians are at a first- or second-generation level in hardware, but their mathematical people and theoreticians could hold their own with anyone in this country," said Paul A. Lotto, director of systems and computer services for the Metropolitan Transportation Authority here.

Lotto recently traveled to the Soviet Union as a member of an advisory committee in the first step of a joint Soviet/U.S. program to study the application of computers to the management of large cities, specifically in the areas of municipal management, urban transportation and urban goods transportation.

The purpose of the government-funded project is to determine what would be mutually beneficial areas for research.

A Soviet delegation will make a two-week visit to the U.S. later this year.

Current computer applications in the Soviet Union were for the most part very modest and stand-alone operations, Lotto said.

"Inventory management and construction project management were very primitive, accounting systems at best," he said. "Their payroll and personnel systems, however, were very complex and impressive because of the elaborate profit-sharing schemes they have."

"In terms of the state of the art, they are five to ten years behind us. They know little or nothing about simulation, and this is an area where we can provide some expertise," Lotto stated.

Much to Learn

"But in terms of automatic train control, we have much to learn from them," he emphasized. "The Moscow metro is a prime example of what our Bay Area Rapid Transit (Bart) system is not. They are much more advanced in terms of automatic fare collection, automated control of energy consumption and automated pollution control."

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COMPUTERWORLD



Finger Pointing Also a Factor

Complexity Faulted in Criminal Data System Problems

By Catherine Arant

BUFFALO, N.Y. — Breakdowns in a criminal justice information system here have been attributed to a lack of cooperation among the vendors involved and to the complexity of the system.

One reason the system was down 35% of the time during August was the "tremendous amount of time spent" trying to determine whose fault each problem was, said Les Meszaros, director of information for the Erie County Department of Central Police Services (CPS).

The system, which consists of a Univac Spectra 70/45, 40 Uni-

scope 100 terminals, Burroughs modems and the telephone company's lines, went on-line Jan. 1 and had no problems 90% to 97% of the time until June, according to Meszaros.

"Ideally, it should have been just a two-vendor relationship," Meszaros said, "with terminals, modems and lines all provided by the phone company. The three vendors are a result of competitive bidding. As a result, the user suffers."

The system is operated by CPS and used by the 29 police departments in the county. Besides containing local arrest and crime information, it links into the

New York State Police Department System, the National Crime Information Center, the New York State Department of Motor Vehicles, the New York State Justice Department and the National Law Enforcement Teletype Network.

An inquiry can be made to all five networks at once, with an approximate response time of 10 seconds. It is the only system in the state that receives criminal histories from a statewide repository — within 2-1/2 hours a user can receive on his terminal a 60-page rap sheet.

Variety of Factors

Breakdowns can be attributed to a wide variety of factors: failure on any of the five networks into which the system links, maintenance problems and weather conditions. Lightning has knocked down lines several times, Meszaros said.

In addition, the system has no dual processor, although Meszaros said he has repeatedly requested one. At present, the only backup the system has are hard-copy files, although CPS

has placed a request for microfilm in its next budget.

Problems are to be expected, Meszaros said, "because the system is very complex; more complex than we expected." He considers a 5% downtime rate reasonable. Downtime started increasing in June when the center's air conditioning wasn't working properly. This went on for an extended period of time. "We countlessly asked the county to correct the problems," Meszaros said. However, he is still not sure whether the room temperature caused the system's problems.

Software Problems Surface

By August, some major software problems surfaced, including a unique disk error which caused a variety of malfunctions such as accessing wrong tracks and losing data. This is when CPS found a lack of cooperation among the vendors, according to Meszaros.

"More expertise from the vendors should have been made available," he said. Each one kept coming in, checking out the system and claiming it wasn't his equipment causing the problem."

It took about 2-1/2 weeks to diagnose the problems, and Meszaros said the 3,000 police officers using the system were very understanding. Local departments were usually notified when the system was about to go down, and operating manuals included instructions and phone numbers in case the system crashed with no warning.

Although parts of the system were down about 35% of the time, the entire network was in-

operative only 15% of that time, Meszaros said.

Favorable Reaction

Generally, the system has received favorable reactions from the police, county officials and the public, Meszaros said.

"It is unique in the country because it has communications with all the state and nationwide computer systems," he said. "It is also the only one that is a dedicated criminal justice system — we don't do any other applications on it."

CPS has received federal funds to enhance the system and, in the next two years, it will be expanded to merge the rest of the criminal justice centers such as courts, holding centers and prisons.

Previously, the county had a limited Teletype network which provided communication between local departments and the Sheriff's office and was used mainly for administrative communications. CPS was established to provide "technical services for local police departments who couldn't afford them otherwise," Meszaros said.

"Our philosophy is to build a system to provide the police officer with rapid communications and access to information that will help him do his job better and more safely."

Meszaros did not know what effect the system has had on the county's crime rate; although FBI figures show crime went up in the county, he said this is due to the more efficient reporting system now used in which all crimes are reported accurately and uniformly.

Underwater DP-Based Device Helps Divers Avoid Getting the Bends

KAILUA, Hawaii — A microcomputer about three times the size of a wristwatch has been developed to help scuba divers avoid getting the bends.

A painful and occasionally fatal condition, the bends occur when gas bubbles form in the blood of divers who surface too quickly after a deep or prolonged dive.

No particular water depth is responsible for causing the bends, according to Kirk Jennings, developer of the underwater device and an electronic engineer at the Naval Undersea Center here.

The condition results as a function of water depth, time spent under water and time taken to come to the surface, Jennings said. "A computer is needed because the combination of these elements is not a straightforward problem."

The microcomputer has an Intel Corp. 8080 microprocessor chip which Jennings has programmed with data from Navy dive tables.

Equipped with a depth sensor which measures the ambient water pressure at any given depth and inputs that information to the computer, the device calculates a safe ascent rate. It

includes a battery power source enabling the diver to remain in the water up to eight hours, Jennings said.

The device will be tested by the Navy and may be manufactured by private industry.

Study Reports Automation Efforts In Oriental, South Pacific Libraries

TEMPE, Ariz. — The Association for Library Automation Research Communications (Larc) has published a report on Larc delegates' meetings with their counterparts in Japan, Southeast Asia, Australia and New Zealand last year.

Entitled "Library Automation: The Orient and South Pacific," the 96-page report contains 20 articles, an introduction by Jack D. Key and a special article on information networks.

Representative articles include "Computer Applications in Libraries of Japan," "The Processing System of Japanese Bibliographic Data of the National Diet Library," "Mechanization of Library Procedures at the Kyoto Sangyo University" and "Computer-Based Cataloging System at the New South Wales

Institute of Technology."

Other articles discuss additional university applications in each of the five countries visited, reports of specific applications within library installations and a study of potential application of automation in Southeast Asia.

Larc can be reached through P.O. Box 27235, 85282.

20-20

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DP-Generated Atlas Shows

Breast Cancer Mortality High in Northern Urban Areas

By Toni Wieman
of the CW Staff

BETHESDA, Md. - Mortality from breast cancer is high in northern urban areas, particularly the Northeast, while rates are generally low in the South, according to a computer-generated, county-by-county atlas published by the National Cancer Institute.

Scattered high rates of leukemia are prevalent in the central part of the U.S. from Texas to Minnesota for both males and females, while high mortality rates from thyroid cancer in both sexes are seen in the Rocky Mountain and North Carolina states, according to maps in the atlas.

The atlas was based on a compilation of more than five million cancer deaths between 1950 and 1969 in all 3,056 counties of the 48 contiguous states.

The atlas may help in pinpointing high-risk communities where detailed studies may detect special cancer hazards that have gone unrecognized until now, according to Dr. Joseph F. Fraumeni Jr., associate chief of the epidemiology branch of the National Cancer Institute. The input data for the computer consisted of all death certificates from the 48 contiguous states that listed cancer as the cause of death.

Automated Cartography

The maps were produced by an automated cartography system developed by the center for the IBM 360 and 370 systems at the National Institute of Health (NIH). This system, Fraumeni noted, interfaced with an integrated graphics software package available for use with computer output microfilm

equipment at NIH.

"We prepared computer-generated maps for 35 cancer sites (bone, stomach, breast, etc.) and discovered a surprising number and variety of 'clusters' or 'hot spots,'" Fraumeni said.

For example, in males, clusters of excessive mortality from cancer of the bladder occurred in New Jersey, New York City and urban areas around the Great Lakes. Rates were also elevated in rural New

Passage of Abortion Law Credited to Mini Data

By a CW Staff Writer

URBANA, Ill. - Barbados was able to get an abortion law passed thanks to information on future population and food supplies provided by a computer.

Fred Handler, research professor of physics at the University of Illinois here, has developed a program which forecasts the consequences of population trends for the U.S. and 125 other countries.

In the case of Barbados, Handler was able to graphically show officials what the population growth for their country would be. In addition, he left them a hard-copy printout of the findings generated by his program for study and presentation to support the passage of the abortion law.

The program, which is sponsored by the Agency for International Development (AID) and the National Science Foundation, can show the historical growth of the population as well as future growth for a country. It can also chart past and future food and energy supplies.

The project uses the Plato computer-

based teaching system and is installed on a 32K Data General minicomputer equipped with a plasma display screen.

The algorithms, written by Handler, work on data supplied primarily by the U.S. Department of Agriculture. The United Nations and the World Bank also supply information for projections.

"Mode of Communication"

"The information is being used for planning and for training people ranging from social workers to ambassadors and ministers in population awareness, motivation and policy," Handler said.

"But essentially, we are using the display as a mode of communication to decision makers, based on the philosophy that by the correct presentation of graphic information we can make people with no previous background in the field understand the implications of rapid population growth on the social and economic welfare of a country," he added.

Under a five-year AID contract, some 10,000 people have been trained at centers in the State Department, Office of Population, University of North Carolina, University of Pittsburgh and University of Colorado at Denver.

While the information is primarily being used in the U.S. at present, there are no plans to put in similar 32K minicomputer systems overseas, Handler said, noting requests have come in from over 50 locations, including Latin America and Southeast Asia.

The systems, once installed, will be fully programmed and updated by members of the project, Handler said.

York and New England and the Mississippi River delta in Louisiana.

Mortality rates for females, however, were not high in New Jersey, but did increase in rural New England.

The maps also pinpointed the fact that stomach cancer deaths are significantly higher than the national average in scattered areas of the northern Middle West and some parts of the Southwest.

On the other hand, the maps showed no unusual cancer death patterns among resi-

dents of communities where drinking water was contaminated by asbestos fibers or where homes were built on radioactive tailings from uranium mines, Fraumeni said.

But "the maps of cancer mortality, together with the correlation studies conducted to date, suggest that environmental factors, including industrial chemicals, account for at least part of excess cancer risk in certain communities," he added.

India, for instance, would thus be able to see that in 1980 it will need 31% more food than in 1970 if there is no change in the rate of that country's population growth, he said.

"Since 1970, food production hasn't increased at all there. There would have to be a 6% increase each year from now until 1980,"

he said.

As part of a two-year pilot program, worshippers of 10 Protestant denominations in five U.S. metropolitan areas will be able to automate their contributions to the church of their choice.

The Commission on Stewardship of the National Council of Churches hopes the project will provide a regular flow of funds for the churches, rather than putting them "at the mercy of tardy, forgetful or vacationing contributors."

The Authorized Contribution Transfer Service (ACTS) will link together churches, banks, credit cards and computers. A worshiper at an Acts member church can fill out an authorization slip directing a specified amount be deducted from his account and deposited in the church's account.

Or, if he chooses, the contribution may be posted to his Master Charge or BankAmericard account. These donations may be monthly or quarterly.

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Program Tracks Reading Skills in Early School Years

By Toni Wiseman
OF THE CW Staff

KANSAS CITY, Kan. — Only three days after the opening of school here this month, a computer is helping to identify and keep track of students' reading skills and problems.

Part of the success of the program is its ability to identify specific reading problems quickly so children can be helped, according to Carl A. Hendon, assistant superintendent of schools for the Turner Unified School District.

Called the Fountain Valley Teachers Support System in Reading, the program measures 288 specific skills considered necessary to become a good reader. These skills are usually acquired in the six years between grades one and six.

Children take tests administered on cassettes to eliminate administrative differences, writing down their answers with pencil and paper. The tests, Hendon said,

are unique because they not only ascertain whether a child has acquired a skill or skills, but also diagnose auditory or visual dysfunctions which might impair reading skills.

The system is very versatile, Hendon said. Students may take tests any time they feel they have mastered a skill, or a teacher can administer the test to an entire class.

One keypunch operator keys in student answers. The operator does not have to note whether an answer is correct; the student's answer is simply recorded, Hendon said, adding "the software does the rest."

Running on an IBM 370/145 at the Wyandotte County courthouse, the program generates each day's test results by the following morning.

The system prepares two key reports, the Pupil Profile and the Results Report. The Pupil Profile charts a student's read-

ing progress and lists deficiencies. It reports his age to the month, reading achievements and skills needing work.

The Results Report shows test activity completed by a student in a single day and lists skill deficiencies.

When a teacher or student feels he is ready, the test is given again, Hendon said; if the student is successful, the particular deficiency note is eliminated from the report.

'In Laymen's Terms'

The reports are produced in duplicate, one copy for the teacher and one for the student to take home. Worded in "laymen's terms," the home report was designed to aid parents in helping their children's progress.

A report might say, for example, "Initial consonant sound B needs more work." This precise pinpointing of the problem is a great advance over just

knowing a child has trouble with consonants, Hendon said.

"These reports facilitate communication between teacher, child, reading specialist, administrators and parents," he added.

"Teachers know how effectively they are instructing since test results are ready within 24 hours. If they see a problem, they can review it with students while the concept is fresh in the pupils' minds."

Other reports group students into categories by skill deficiencies; by students within a particular class; across all grade levels in one school; and within a particular grade level in one school.

Hendon feels the difference the program has made should be measurable within three years. It will also enable each school to measure the effectiveness of various reading programs.

This year, for instance, three different reading programs are being used in kindergarten classes.

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Editorial

CW Solicits Data Entry Views

By now nearly everyone realizes IBM no longer manufactures keypunches of any kind and refurbishes only returned units. But it is more difficult to say just what users want to replace their existing data entry equipment.

This survey is geared to get a cross section of ideas on just what data entry tools typical business users would like to see developed over the next five years. The results of this survey will be published in the Oct. 29 Data Entry Special Report in *Computerworld*.

For your convenience, you can use the postage-paid subscription envelope stapled into this issue. Just cross out "Circulation" and write "Editorial" so your vote and views can be tabulated quickly. Additional comments can be attached directly to this form.

- What is the best description of your center today?
 - ☐ Heavily centralized batch data entry
 - ☐ Centralized batch data entry with less than 50% remote batch
 - ☐ Centralized batch data entry with less than 50% on-line data entry
 - ☐ 50% or more remote batch
 - ☐ 50% or more on-line data entry
 - ☐ Other _____
- How many keystations do you presently have installed? _____
- Which of the following data entry approaches are ahead for your center over the next five years?
 - ☐ Heavily centralized batch data entry
 - ☐ Centralized batch data entry with less than 50% remote batch
 - ☐ Centralized batch data entry with less than 50% on-line data entry
 - ☐ 50% or more remote batch
 - ☐ 50% or more on-line data entry
 - ☐ Other _____
- Which of the following technologies are you presently using within your installation for data entry?
 - ☐ Keypunches _____ OCR or other mark readers
 - ☐ Dedicated application terminals (such as point-of-sale devices)
 - ☐ Key-to-disk _____ Key-to-diskette
 - ☐ Key-to-cassette
 - ☐ Direct on-line entry (general-purpose terminals)
 - ☐ Other _____
- Which of the following technologies do you see as taking a greater share of your data entry requirements?
 - ☐ Keypunches _____ OCR or other mark readers
 - ☐ Dedicated application terminals (such as point-of-sale devices)
 - ☐ Key-to-disk _____ Key-to-diskette
 - ☐ Key-to-cassette
 - ☐ Direct on-line entry (general-purpose terminals)
 - ☐ Voice recognition
 - ☐ Other _____
- Considering the wide range of data entry equipment presently available, just what would you like to see vendors accentuate and develop over the next five years?

My job function is:

- ☐ Management
- ☐ DP Management
- ☐ Programmer/Analyst
- ☐ Other _____

Identification (Optional)

Name _____
 Title _____
 Company _____
 Address _____

Can we quote you personally?

Yes _____ No _____



Terminal Output

Letters to the Editor

Replies to Chauvinist Smack Of Lack of Reticence

I wish to register my indignation and disappointment at the arguments used by John Morris and Barbara McLean [CW, Sept. 3] in their replies to Thomas Mooshammer's letter [Aug. 20]. The glow of self-righteous fervor which their letters projected should not be allowed to blind the reader to their use of illogical appeals to nationalistic prejudice.

Morris was "reminded" that Mooshammer's countrymen can hardly be expected to grasp "... scientific methods in sociological research," handicapped as they are by the burden of a guilt-stained past.

McLean, too, was "reminded" by Mooshammer of "a former spokesman of his country," but she is above mentioning names—let the gentle reader dredge up the name of the architect of the Final Solution to the Jewish Problem from those same dark depths of his memory wherein lie the most awful specters of mortal terror and moral revulsion.

It is this use of innuendo, this evocation of mindless chauvinism that elicits my indignation. My disappointment is in the inability of these members of a profession dependent on rationalization to present a logically thought-out argument for their point of view.

New York

James Walker

Women Represent Talent

Undoubtedly *Computerworld* has had an incredible response to Thomas Mooshammer's equally incredible letter.

I noticed CW printed two responses from female readers and one from a male reader. I hope this does not indicate that our female counterparts are twice as outraged as we.

I do not know what position Mooshammer holds but, if it is management, let him remember his job is to get the work done as effectively as possible. It makes no difference to the user if the information is manipulated by males or females, just that it is correct.

Talent is neuter, and why Mooshammer would cut himself off from 51% of the talent is beyond me.

Mason, Mich.

Dave Goodman

DPers, CW Must Shape Up

Computerworld has already been lambasted sufficiently for even printing the article on women in DP [CW, July 23]. But I think I have figured out why it was done.

A few weeks ago, I wrote and protested the

massive borders around Black Hat/White Hat. As expected, no change. Now I think I know why. And the whys are the same.

Come clean, CW! CW is hard up for reader response—no letters to print, so it has to run sensational, ludicrous articles to generate more than apathy from its subscribers.

Only trouble is, it's a double indictment. And every reader who doesn't sit and write his viewpoint on the issues of DP deserves the face slap such trash as this article on women was.

Now, who's going to shape up first?

Alan P. Schlusmeyer

Pasadena, Calif.

Where Are The Facts?

Having been responsible for the maintenance of The New York Times Information Bank on and off for the past 3-1/2 years, we would like to comment on both Peter Denning's statements in the article, "Rites Not Helpful All The Time," in the June 4 issue and F.T. Baker's letter to the editor in the Aug. 13 issue.

First of all, Denning is completely unaware to us. Therefore, his opinions regarding the maintainability of the information bank, the number of bugs found therein and the difficulty in completing it are, at best, hearsay.

As for it being a "disaster," we completely disagree and would like to believe that irresponsible statement had to be either a misquote or some feeble attempt at humor at the expense of the system.

As far as Baker is concerned, though we have the greatest respect for his ability and for the product he delivered, his statements regarding the success he enjoyed in both developing and maintaining the bank have always tended to be somewhat self-serving and misleading. His responsibility ended 3-1/2 years ago, and all bugs, functional specification shortcomings and other system deficiencies encountered since then do not appear in his statistics.

In addition, it is not for the developers of a system to judge its maintainability, but rather for those responsible for actually maintaining it.

In conclusion, we at The Times find it rather irritating that, all too often, there are people who write articles, give lectures and answer questions on the information bank without any direct knowledge of the subject matter.

Is the system readable, maintainable, bug-free, hard to complete, etc.? Only the people who read it, maintained it, fix bugs, complete it, etc., can comment knowledgeably.

Stanley Kaplan
 Harvey Morgenstern
 Bob Blumfield
 The New York Times
 Information Bank Project

The New York Times
 New York

By Paying Stock Dividends

IBM Attempting to Finish Embarrassing Cash Hoard

By George Warren

Special to Computerworld

It's true, the rich get richer. Giant IBM, which has spent the last several years amassing a huge cash fortune, now has the greatest hoard in its history — over \$4 billion.

IBM has greater cash assets (defined as cash in banks and near-cash marketable securities) than most banks. IBM earns more from interest on those assets than most computer manufacturers earn from their hardware business.

As a profitable and growing computer vendor, IBM must be somewhat embarrassed by its declining earnings from operations. After years of ever-increasing profits, IBM's net income from the manufacture and sale of computers was off about 5% for the latest quarter, compared with a year earlier.

As a bank, however, IBM is growing very nicely. For the latest quarter, "other income," which is mostly interest from near-cash investments, was up 20% from last year.

In terms of liquid assets only (that is, excluding such things as factories and computers on rent to customers) IBM would rank within the top 30 banks in the U.S.

IBM's spurt of earning interest is a direct result of its ever-bulging hoard of cash. From a "modest" \$1.6 billion at the end of 1969, the cash cache swelled to more than \$4 billion at the end of 1974, up by a factor of 2-1/2 in five years.

Cash represents about 30% of IBM's total assets, almost as much as the book value of IBM's stock is to customers (which is about \$4.3 billion).

Interest rates have been high for the last several years, so IBM has enjoyed a compounding of interest earned from its investments. The 1974 year-end financial results.

Reader Commentary

port showed record high interest income, averaging more than 8% return on investment.

Any business requires a certain amount of cash to operate, to sustain its daily business activities. But IBM's cash is so great, it is sufficient to cover all operating expenses — assuming no incoming revenue — for more than five months.

In the five-year interval 1969 through 1974, IBM's gross revenue from operations increased by about 40%. During this same period, the money pot grew three times as fast as gross revenue.

Cash a War Chest?

Indeed, IBM's reasons for accumulating this vast wealth are mysterious. In an earlier analysis "What Is IBM Going to Do With Its Trapped Riches?" (CW, Aug. 8, 1973) I suggested the cash might be a war chest, held aside for the possible

payment of huge antitrust judgments. But Telex, which had asked more than \$1 billion in damages, was awarded only about a quarter of that, and that award was overturned by the appeals court.

If Telex could not win its antitrust case, it is unlikely that others (Memorex, Sanders, etc.) will be able to prevail against the Armonk giant.

The government's antitrust case seems to be headed for a consent decree, perhaps breaking IBM into small pieces, but probably not imposing a cash fine. So the war chest would seem unnecessary.

Nor can IBM's acquisitions of other businesses have much effect on the mounded cash.

The proposed IBM joint venture with Comsat for a satellite data communications system predictably drew cries of antitrust pain from competitors. The total investment would be modest by IBM's standards, but the resulting impact on others in the data communications business could be severe.

The American also worries about the competitive impact of such deals by any giant.

In government industry. The Federal Communications Commission is holding up the IBM-Comsat venture until it receives proper assurances that competition will not be stifled.

It would seem that almost any significant IBM acquisition would draw similar scrutiny from government and competition alike.

Apparently, the long-rumored IBM Fu-

ture Systems (FS) project, involving the development of a next generation of hardware and software, had been either shelved or scaled down. IBM seems to have decided to continue to market the 370 line of equipment to universal last year. So the current development costs of the FS project probably have been reduced, lessening the need for development cash.

Profitable though they may be, IBM's cash assets continue to earn at a much lower rate than its factories and sales and service organizations. Despite the recent simultaneous rise of interest income and drop of operating income, IBM receives about 46 cents of gross income from each dollar invested in plant and rental machines, but only about 8 cents from each dollar held in cash or marketable securities. IBM's banking operations, while growing, are relatively poor business compared to its traditional efforts.

To relieve itself of some of its cash, IBM continues to increase dividends paid to stockholders. The current annual dividend rate is about 25% higher than last year. Dividends to shareholders would seem to be the only practical way to reduce the stored riches. Dividend payout to 1974 increased \$165 million from 1973. Cash increased by "only" \$24 million. The increased dividends prevented further swelling of the cash balances.

Stockholders can hope that the dividend rate to continue to grow. IBM (Continued on Page 14)

Darmstadt System Eliminates Check-digit Loopholes

The Pennsylvania Bureau of Sales and Use Tax some time ago adopted a Modulo-10 check digit to safeguard a seven-digit number. The technique it selected

was to multiply the first digit by 7, the second by 6 and so forth until the last digit was multiplied by 1. It then used the Modulo-10 complement of the answer as the check digit and placed it after the seventh number.

The system worked like this for account number 1234567:

Account Number: 1 2 3 4 5 6 7
Check Digit Multiplier: 7 6 5 4 3 2 1

Check Digit Computation:
1 x 7 = 7
2 x 6 = 12
3 x 5 = 15
4 x 4 = 16
5 x 3 = 15
6 x 2 = 12
7 x 1 = 7

Total = 84
Mod-10 = 4
10 Complement = 6

Therefore, the number assigned as a check digit for 1234567 was 6.

The system was expected to catch single-digit errors in any numbers and also to catch transpositions of numbers. There were, it seemed, six possible transpositions to be considered — those between the first and second, between the second and third and so on.

System Weaknesses

However, in practice, the system has not lived up to expectations. A seventh transposition, previously unnoticed, was found. This was between the seventh and eighth digits.

Thus, in the case of account number 123456 + 6 developed above, the trans-

position 1234566 + 7 could occur. Since the last multiplier before the check digit is 1, this, unfortunately, happens to be a valid number complete with its own check digit.

In fact, every time this transposition occurs on this system, a valid number is produced — weakness number one.

A second weakness turned out to be the use of the digit 5 as a multiplier for the third digit position. Multiply 5 times 3; the result ends in 15. So does 5 times 1; 5, 7 and 9. Equally, 5 times 0, 2, 4, 6 and 8 all have 0 as the last digit.

Mistakes in the third digit, then, are caught only when an odd number is mistakenly read as an even one or an even one is read as an odd one. If all numbers are equally populated, this suggests about 50% of the mistakes made on this digit just slip through the check digit system.

Understanding Checks

While these facts are now appreciated, the fact they were not realized before the system was designed suggests it would be as well to understand a little more about the errors that can slip by check-digit systems, as they are quite numerous and can be avoided with a little forethought.

If one makes a table of the digits when multiplied out, arranged in order of possible confusion, one finds only four of the 10 digits provide unique solutions for the first multiplication. These are 1, 3, 7 and 9.

All the even numbers have only five result digits to spread among the 10 possibilities, because they result in even numbers whether the original digit is even or odd. As for the digit 5, we have already discussed its problems.

As you can see from the figure, this means that in the Pennsylvania case, 1234567 + 6 and 1234517 + 6 would all be accepted as being good numbers, although single-digit errors have occurred in the second, fourth and fifth digits.

These errors in each case are somewhat more important because of the actual

error situation that is missed. In all the even-number multipliers, the numbers that can slip through the nets are the same pairs — 6 is indistinguishable from a 1, 3, 7 from a 3, 5, 8 from a 3, a 9 from a 4 and a 0 from a 5.

For each single error, only one wrong answer is acceptable but, no matter what the even multiplier, it happens to be the same wrong number.

And, more importantly, it happens to be always the digit five away from the right answer that can slip through. Or, as some old timers in computers may realize, it is the biquinary equivalent.

Unfortunately, it is not only computers that use biquinary scales early in the game of numbers. Biquinary, or two-five numbering, came naturally to us two-handed, five-fingered people. And the very numbers we use in handwriting are, in fact, biquinary related.

The digit 6, badly written, can come out very like a 1 — 2 can be easily confused with a bad 7, 3 and 8 although related in shape are not easy to confuse, but some people's 4s and other's 9s can be misread. So the type which slips through the net includes some of the easiest errors to make — which makes everything more serious.

Single-Error Vs. Transpositions

While single-error detection suggests that systems should only use weights of 1, 3, 7 and 9, the four other digits are transpositions — catching transpositions involves keeping the differences between the adjacent multipliers as unique as possible. All the differences between the 1, 3, 7 and 9 are even — and so must let some (10% or more) of the single transpositions through also. Which means they will be determined by the weights themselves, but they will exist as loopholes in the system.

To obtain complete coverage of transpositions, the difference between adjacent weights must also be the 1, 3, 7 and 9 values, which on pure Modulo-10 work is clearly impossible.

Luckily, a solution to this impossibility is available with as small a deviation from the Modulo-10 technique as possible. It occurs in a system which is used by a German book club, Deutsche Buchgemeinschaft or Darmstadt and doubtless other places. The system uses for a seven-figure number multipliers and also the digits of the first, third, fifth and seventh digits, using 2 as the multiplier.

This effectively maps the results of each of these numbers into all 10 decimal digits and gets away from the prior 1/6, 2/7, 3/8, 4/9 and 5/0 confusion. For example, 1 multiplied by 2 becomes 2 and stays 2 when the digits 0 and 2 are summed. But 6 goes to 12, which when summed becomes 3, and will no longer get confused with 1 as previously was the case for any even multiplier.

Having got out of the difficulty this way, the system uses all ones as multipliers for the even digits. So no trouble there about confusion so far as single-digit error is concerned, as one is one of the four original digits available.

Similarly, in transposition problems, all the differences between adjacent weights are again optimal — being 1 in all cases. The total multiplier is then simply 2121212.

The Darmstadt system seems to work as far as I can see and, hopefully, can be adapted to Pennsylvania State law. The Pennsylvania Sales and Use Tax, are not giving the results that had been expected of them.

My thanks are due to Professor Glaser of Pennsylvania State University for the two check-digit examples used. If anyone can suggest good references on the subject, which is not often written about as far as I can see, it would be appreciated.

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The Taylor Report

By

Alan Taylor, CDP



Don't Break Up AT&T — Just Break Up Its Monopoly

By Joe Wright

Special to Computerworld
Some readers may have viewed my article, "Darning AT&T and IBM in One Breath a Mistake" (CW, Nov. 20) as an attack on AT&T and probably concluded, for instance, that I applaud the antitrust suit recently filed against AT&T. They're wrong on both counts.

In fact, AT&T deserves quite a bit of praise. Its services are authentic. One only has to compare phone service in the U.S. to that in other countries to

see the magnitude of its technological and service achievements.

In most, if not all, other countries, telecommunications is government-owned and operated. Here in the U.S., it is at least "only" regulated. Lesson: the free from government control an enterprise is, the more likely it is to be efficient and innovative and a provider of quality services.

What I wanted at that article was the monopoly position of AT&T. I maintain no business has a right to bar com-

petition, for that is a breach of free enterprise and should be stopped.

Reader Commentary

I said AT&T's monopoly position had led to a decline in the quality of service. However, I did not imply by this that service quality is now in a decline.

A monopoly position in which a company is not just the only supplier of a service or product

but, through the power of government, can prohibit competition creates a situation ripe for

stagnation and avoidance of expensive technological advances. Faced with complaints about service, such a supplier can cavalierly tell you that if you don't like it, go somewhere else — with full knowledge that there is nowhere else to go.

In short, lack of competition with AT&T has removed one very strong incentive — although not all incentives — to higher quality of service, technological progress and diversity of services. For instance, it is primarily due to such limited competition that has arisen that AT&T is offering its Digital Data Service, new types and colors of telephones, high-low pricing, etc.

Break Up AT&T?

Recognizing the efficiencies that can be derived from vertical integration, I don't advocate breaking up AT&T. But I do advocate breaking up its government-provided monopoly position.

The recently filed antitrust suit seeks to do both. I'm opposed to it.

Antitrust is a notorious contradiction of property rights at its history is one of incredible irrationality and injustice. The function and goal of antitrust is the sacrifice of ingenuity, ability and success to mediocrity, incompetence and failure.

All antitrust laws should be repealed, freeing every business to grow as big as ability, competence and economic competition will allow.

Whether the object of an antitrust suit is a noncoercive "monopoly" like IBM or a coercive monopoly like AT&T, in the name of property rights and free trade the suit should be opposed. Antitrust has wrought more economic destruction than any monopoly ever has or could.

In a free society you don't have to deal with a monopoly — you always have the power of the pocketbook. But who can defend himself against the irrational, contradictory and unjudicable antitrust laws?

As I have urged IBM, I would now urge AT&T: Fight, fight, fight! Run these hack Justice Department antitrust lawyers in

circles — load them down with piles of paper and a maze of paperwork that they, as bureaucrats, fully deserve. Arm yourself to the teeth with facts, figures and arguments. Speak with self-confidence and moral certainty.

But — and I emphasize this — don't plead your case on the basis of your "right" to be the only telecommunications company. No one has the right to a legally closed market. If you take this tack, you'll lose your corporate shirt.

IBM Attempting To Diminish Cash

(Continued from Page 13)

has historically been a growth stock, rather than an income stock. At today's annualized dividend rate and market stock price, IBM yields about 3.5%. To reduce its cash, IBM could easily increase its cash dividend payment by a factor of two or three, suddenly making the stock a highly respectable income producer for shareholders.

Indeed, it would seem IBM's future income-producing abilities now surpass its business growth possibilities. Thousands of rental machines pour regular monthly revenue into IBM's bank accounts. Much of this revenue is now charged to depreciation, rather than being added to earnings. In 1974, depreciation charges were \$1.86 billion, slightly more than net earnings of \$1.84 billion.

With the apparent postponement of FS technology, existing 370 equipment could be in use in the field creating income long after it has been fully depreciated on IBM's books. Dollars which formerly had been charged to depreciation would then show up as earnings.

Fat dividends could be paid from the cash hoard and could be sustained by the increased earnings. In the process, IBM might finally be able to diminish its embarrassment of riches.



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SOFTWARE & SERVICES

Regional CPE Meetings Set for S.F., Atlanta

Regional meetings to compare computer performance evaluation (CPE) tools and techniques have very clearly taken hold.

The Measurement and Evaluation Group — based in San Francisco — has scheduled its third meeting for Wednesday, Oct. 15. The time and location of this session are available from Bruce Grant at Stauffer Chemical, One Embarcadero Center, San Francisco, 94111.

Closer in time is the organizational meeting of the Southeastern Regional Computer Measurement Group — an outgrowth of the Comres-sponsored meeting last month [CW, Aug. 6] — in Atlanta on Sept. 22.

Essentially a planning meeting, it will have to be limited in size, but anyone interested in attending may contact Bob Bishop at Comres, 2840 Windy Hill Road, in Marietta, Ga. 30067.

Random Notes

Varian 620, V70 Mimic Get 'Higher Operating System'

ELMSFORD, N.Y. — Programs can be written and debugged faster and easier than before on Varian 620 and V70 minicomputers using the Fortran-based Higher Operating System, according to its vendor, Information Displays, Inc. (IDI). Higher employs dynamic memory allocation to large systems of programs that can be executed without concern for memory size or overlay structure, IDI explained. Higher features a control language, file system, I/O device independence, a Fortran compiler, job isolation, interrupt processing and debugging facilities.

The software can run in a 16K memory with a 500K disk and a high-speed binary input device.

Higher is available for \$4,000 including training and installation, IDI said from 150 Cleburn Road, 10523.

Reality System Gains Basic

IRVINE, Calif. — Microdata Corp. has added an extended version of Dartmouth Basic language, called Data Basic, to its Reality system to act as a programming facility for use with the existing data base management system.

Reality's main purpose as a small business computer system is to fulfill a transaction-oriented information management function. The addition of Data/Basic will reduce the development time for applications and will provide increased efficiency, the company is at 17481 Red Hill Ave., 92705.

One Year Later, AtsUs Still Growing

by Don Leavitt
of the Cowi Staff

NEW YORK — One year after a pair of time-sharing users proposed the formation of a special interest group, the Association of Time-Sharing Users (AtsUs) has 700 paid-up members and is still growing, according to the group's president, Hilfel Segal of Hertz Corp.

The purpose of AtsUs was — and still is — to foster an interchange of users' ideas and experiences with commercial time-sharing vendors. Early on, Segal and the other founders hoped to develop generalized benchmark programs by which the various vendors could be evaluated objectively.

That goal hasn't been attained, Segal acknowledged recently, and users are still left with a maze of confusing rate schedules and service offerings. But AtsUs has established approximately 20 local chapters and special interest groups to help defuse the confusion.

Another more toward ending that confusion may be under way. Recently the national board of directors invited representatives of the local chapters to come to New York for a seminar on cost analysis of time-sharing services.

The presentation was made by an independent consultant and, if the invited attendees approve, AtsUs will sponsor the seminar in each of the chapter cities.

User, Vendor Membership

The chapters, located in many of the metropolitan areas across the country, hold regular — and monthly — meetings which include panel discussions by users on how to choose a vendor and presentations by network vendors of new services and by terminal vendors of their new equipment.

Bomp Programs Linked to IDMS

WELLESLEY, Mass. — A software package providing a "bridge" between IBM's Bill-of-Materials Processor (Bomp) and Cullinane Corp.'s data base management system, IDMS, has been developed by Cullinane and is now available as part of IDMS.

This package should help in developing application systems under IDMS, especially those where IBM's Bomp, Dbomp, MRP or CFMS packages are currently in use, Cullinane said.

Included with IDMS at no additional charge to the users, the package consists of a manufacturing bill-of-materials prototype program, a bridge program to interface IBM's bill processor retrieval programs to the IDMS data base and a documentation package.

The bill-of-materials prototype program indicates the sequence and structure of data base access needed to perform nor-

To encourage cooperation rather than contention between users and vendors, membership in AtsUs is open to both. Associate members — "individuals primarily involved in the sale of time-sharing services" — are not permitted to hold office or vote, but are welcome to participate in all other AtsUs activities, Segal said.

Activities open to the members include contributing to a monthly newsletter and preparing presentations for the group's national meeting, in addition to participation in the local chapter meetings.

They are also encouraged to respond honestly "and promptly" to surveys put out by or with the cooperation of the national organizations, Segal said.

The most important of these surveys, in his view, will be the one run by Datapac Research Corp. to get user evaluations of the vendors' services and support. Published in one of Datapac's "A Buyers Guide to..." reports, ratings in past years have been faulted for being based on too few user responses, Segal noted.

'Oscar' Aids Schedule Planning Provides Prior Work Review

ATLANTA — IBM installations with 64K bytes of memory, two tape drives and a disk unit can schedule workloads for the future and document how well 'work' was handled in the past with the user installation. Using this base, it generates reports for the operating personnel indicating jobs scheduled to be run during the target period.

Developed jointly by the vendor and the Trust Co. of Georgia, Oscar is not as

To overcome that complaint and make the ratings more useful to Datapac subscribers and AtsUs members, Segal urged them all to answer the questionnaire when it is distributed next year.

The cooperation works both ways, he admitted, since Datapac provides copies of its report to all new AtsUs members.

The association plans to publish a directory of time-sharing services later this year. It will be geographically oriented, Segal said.

Another directory, covering actual remote-computing services available, may be published later, but the first effort will be to let users know where personal help really is available, he said.

"A lot of the vendors have In-Wats service and that's fine if you know what you're doing, but it's not much help if you don't," he explained.

The fee for AtsUs membership is \$20 for both regular and associate categories. The association's mailing address is 210 Fifth Ave., 10010.

sophisticated as some schedulers on the market, but neither — at \$5,000 — is it as expensive, a spokesman noted.

Oscar maintains a data base of information about jobs that are to be run at the user installation. Using this base, it generates reports for the operating personnel indicating jobs scheduled to be run during the target period.

Linked into a job-accounting routine, the system can report jobs scheduled but not run in prior time slots as well as provide daily and monthly performance statistics.

To get schedules from Oscar, the user inputs basic information about the jobs that are to be run, their peripheral requirements, processing frequency, sequence and partition.

The software makes no attempt at optimizing the job mix, as some of Oscar's competitors do. This is, however, only a minor shortcoming from most installations, the spokesman argued, since few sites reevaluation of the schedule worthwhile.

Oscar can handle more than one set of accounting periods, company holidays and business days and multiple CPUs — with as many as 15 initiators or partitions scheduled on each, according to the spokesman.

Made up of six ANS Cobol programs, Oscar will be delivered by mail for \$5,000 or supported by three days of on-site vendor training for \$6,000.

Computer Concepts Corp. is at 6244A New Peachtree Road, 30340.

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GLEN ELLYN, Ill. — IBM-based shops with 50K to 70K bytes of main storage can use the Swapper package from Systech to standardize Cobol programming throughout the installation.

With this support, each worker can code in the way most comfortable to him, but the final result will comply with installation standards, Systech noted.

Swapper cuts down the amount of coding required by the programmer because it supports the use of abbreviations which are expanded into full Cobol terms by the preprocessor. Unlike some similar packages, however, this one does not force the use of predetermined abbreviations of its own; the user defines only those he wants to use.

With Swapper, an ascending numerical prefix can be appended to all paragraph names but, again, this is a user option. So

is a facility that recalculates data division level numbers, using any one of five increments the user designates.

Handles Indentation Chore

Indentation is another chore Swapper handles, the vendor said. Data division entries can be set in as many as 10 levels deep and nested IF statements in the procedure division are also indented by the system.

Review of the IF indentations can sometimes pinpoint logic flaws, Systech noted. Uniform placement of elements common to Cobol programs includes positioning of PICTURE, USAGE, VALUE at predetermined target locations "whenever possible."

Swapper also stacks multiple receiving or object fields of the OPEN, MOVE, USING, GO TO... DEPENDING, and

CLOSE verbs.

In addition, the software correctly positions "wandering periods, commas and parentheses," the vendor said.

Swapper breaks lengthy run-together statements into verb/object relationships and deletes superfluous reserved words, a spokesman added.

Output from Swapper can be printed, punched or written to a user work file on either disk or tape.

Written in ANS Cobol, the package is available now for a one-time charge of \$1,495 from Systech at 356 Windsor Drive, 60137.

**Tymshare Network
Aids Micro Users**

CUPERTINO, Calif. — Tymshare, Inc. has installed assembler/simulator software on its Tymnet network for the Texas Instruments (TI) TMS1000 microcomputer and TMS8080 microprocessor and for the Motorola M6800 microprocessors.

Developed by TI's semiconductor group, the TI microchip programming aids run on Tymshare's Tymcom-370 systems.

The Motorola assembler/simulator package, developed by Wintek Corp. of Lafayette, Ind., is designed for Tymcom-X systems employed by Tymshare.

The microprogramming software aids provide users with an on-line program development capability whenever needed anywhere along the 80-city Tymnet network in the U.S. and western Europe, Tymshare noted.

The interactive, time-sharing environment of Tymnet allows users to work with Tymshare's text-editing program, Editor. With it, the designer can create source and data files, correct errors and make changes to the source code.

Tymshare is based at 20705 Valley Green Drive, 95014.

Trendata 4000 Gains Plotting

SUNNYVALE, Calif. — Trendata has a host-resident plotting software and support package for use with its 30 char./sec Model 4000 terminals equipped with an optional plot hardware feature.

The package, on paper tape or punched cards, is written in Fortran and is compatible with the software and CALLING standards of California Computer Products, Inc. equipment.

Transferable from one host CPU to another, the software — and the optional plot feature — can be leased for \$5/mo from Trendata at 610 Polmar Ave., 94086.

Spanish 'Spoken' Here

CARACAS, Venezuela — With documentation for installation and operation translated into Spanish, the Libris DOS/VS partitioned balance from Datachron Corp. of New York City and the CBL-short preprocessor and other packages from General Electronics of Lyons, Ill., are now being marketed in South America by Computacion y Lubel.

The marketing firm can be reached at Apartado 14105, here in Caracas, 101.

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Add ENDIF, ENDPERFORM, Ad Hoc Committee Tells Codasyl

OSSINING, N.Y. — Cobol should be extended "at the earliest practical time" to include two features which "would greatly facilitate the writing of structured programs," according to Daniel D. McCracken, author and consultant.

Concepts and Techniques

One feature, an ENDIF operator, "is badly needed to clarify the scope of control of the IF statement," he said in a recent letter to Codasyl's Programming Language Committee — the voluntary group responsible for the definition and maintenance of Cobol.

In the second place, McCracken said, "the PERFORM verb should be modified to permit the controlled code to be in-line, immediately following the PERFORM. This would necessitate the introduction of an ENDPERFORM operator."

The two suggestions were made by McCracken "as chairman of the Structured Cobol Committee, a strictly ad hoc organization that grew out of conversations at the IEEE Computer Society workshop on structured

programming at Lake Arrowhead last September," he told Codasyl.

According to a list attached to McCracken's letter, there are 17 members of his committee. Six "concur with these recommendations. Two members declined to support them on the grounds they would like to see very much more extensive changes in the language.

"The remaining members did not respond," he said.

Ends Awkward Situations

The ENDIF operator would eliminate a number of awkward situations that frequently arise and would tend to reduce programming errors, the consultant claimed, adding "it would also be helpful if termination operators were available for the AT END, ON SIZE ERROR and INVALID KEY phrases."

The ENDPERFORM operator "would clarify program relationships by greatly reducing the number of paragraphs that exist solely because of the syntactic requirements of PERFORM... UNTIL and PERFORM... VARYING options." Codasyl was told.

The members who support

these recommendations felt the ENDIF operator is the highest priority item, followed by the in-line PERFORM and then the termination operators for the other phrases, McCracken noted.

"A proposal to recommend a CASE structure to be added with little enthusiasm," he admitted to Codasyl. The ad hoc group felt the need for such a structure has been "exaggerated," he said.

He closed his letter with the thought that his recommendation was a modest change which would greatly facilitate structured programming in Cobol "without changing the language into something unrecognizable as Cobol and which would have the appearance of a cut-down version of PL/I."

Comment Creates Visible Period

By Theodore G. Budrow

Special to Computerworld

William B. Simmons' article on the use of the "structured period" [CW, Aug. 20] mentioned one drawback — that of having a space before the period which "is nonstandard, and may be treated differently by different compilers."

If a particular compiler does not allow the space-period format, the same visual effect could be achieved by using a line of coding which is blank except for asterisks in columns 7 and 12 or an asterisk in column 7 and a space in column 12.

Since the first asterisk denotes a comment line and everything in that line is not considered by the compiler, a visual logic break could actually do more [than Simmons' period] by including some explanatory data as well.

With the comment line approach, a real period would, of course, have to be used in its proper place so the compiler will "know" when the programmer's logic actually breaks.

Budrow is a programmer at Read's, Inc., Baltimore Md.

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Keane Sets DBMS Slate

WELLESLEY, Mass. — Keane Associates, Inc. has scheduled a series of seminars related to data base management systems (DBMS) for presentation in the Boston area later this month and October.

"Concepts for Management" will be essentially nontechnical, concentrating more on costs and benefits of the systems than on specific features. This one-day course will be held next Wednesday, Sept. 24, and costs \$200 per attendee.

Evaluation of the major systems now on the market will be the focus of the two-day "Introduction to Data Base Concepts". This \$350 course is scheduled for Oct. 15-16.

Getting down to specifics, "Designing an IMS Data Base" is intended for data base administrators and analysts in shops that have already made a commitment to the IBM-marketed system.

Running three days, this course starts Sept. 29 and ends Oct. 1 and costs \$500 per person.

Programmers experienced in Cobol, PL/I or Assembler are the students expected in the "Programming for IMS and DL/I" two-day course scheduled for Tuesday and Wednesday of next week, Sept. 22-23. Places in this seminar can be reserved for \$250 each.

Keane is at 36 Washington St., 02181.

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Coast-to-Coast Datadial User Reports Savings

By Ronald A. Frank
of the staff

NEW YORK—One of the first coast-to-coast users of the Data Transmission Co.'s (Datran) Datadial service has reported he is saving money and improving his operations.

Republic Financial Services of Dallas is using Datadial to transmit file and homeowner policy information from Dallas to New York and Los Angeles, according to its vice-president, Earl Young.

Speaking at a session of Info 75 in New York last week, Young said a 100-mile, five-minute call on Datadial at 2,400 bit/sec costs 8 cents. The same data transmitted on Wats lines is \$1.75 and on a dialup call the cost is \$1.45.

Republic is also currently using Datran to transmit data to Baltimore, Philadelphia, Detroit, St. Louis, Chicago, Kansas City and Tulsa. And the company plans to convert from Bell lines to Datran as soon as service is available in Denver, Milwaukee and Atlanta.

If intrastate tariff problems get resolved in California, Republic will also use the new carrier for transmissions to San Francisco and San Diego.

The company has been using Datran facilities since January of this year, so it is not yet possible to quote exact dollar savings, Young said. He estimated, how-

ever, that the new facilities will cost about 25% less than Bell lines, but called this a "conservative projection."

All of the insurance data is being transmitted at 2,400 bit/sec from key entry equipment supplied by Computer Machinery Corp. (CMC) to a Honeywell 7500 intelligent terminal. An on-line software system from Cybertec is being installed that will operate on an IBM 360/65 in Northbrook, Ill., Young said.

Data sent from Dallas is entered on Four Phase CRTs while batch data is handled on Data 100 terminals. A 9,600 bit/sec line is used which is operated in split-stream mode driving two 4,800 bit/sec lines.

The on-line CRT operation is used for input and inquiry while the batch operation handles program assembly and checkout functions, Young said. The company also is installing a Honeywell 2050A mainframe and all data transmission operations will be transferred from the CMC equipment to the CPU by the end of this year.

No More Restarts

Before Republic switched to Datran, high error counts were being experienced on its Bell lines, Young said. In many instances "restarts" were re-

quired which meant "constant surveillance by an operator."

With the Datran facilities, the company has "encountered no restarts and transmission is virtually error-free," he said. There has been only one period of downtime—when a storm knocked out a Datran microwave tower, causing an outage of four hours.

Initially there were some errors when the Datran lines were installed but, when the Bell local loops were brought up to Datran standards, most of the problems were eliminated, Young said.

The average call setup time on Datadial is "less than one second—a vast improvement over the 10 to 20 seconds required to complete a DDD or Wats" call, he said. The Datadial billing increment is one second—59 seconds less than that offered by the established carrier, he said.

A major feature of Datadial is "smp-on call back" which is not available on either DDD or Wats, he said. Datadial is available at speeds up to 9,600 bit/sec "unlike the 3,600- to 4,800 bit/sec range offered by the other carriers," he said.

Clear-ended time on Datadial "was guaranteed at 2 msec," which was a considerably shorter interval than the 150 to 200 msec interval experienced on telephone company lines, Young said.

With 'Profit' System

Bank's DP Work Accomplished With Remote Terminals

OBERLIN, Ohio—The Oberlin Savings Bank uses software developed in Cleveland, run on a CPU in North Carolina and accessed by terminals in Ohio to get its DP work done.

The bank uses CRTs supplied by Applied Digital Data Systems, Inc. (AddS) to access a data base stored on an NCR Century 251 mainframe at Winston-Salem, N.C.

Oberlin's DP system, which went into operation last November, makes use of a customer information file plus marketing, accounting and management reports in a single package. The system, called Profit, was developed by Central National Bank of Cleveland.

"The key advantage of the Profit system is that we receive accounting and management data and also a central information file about our customers," Raymond D. Campbell, Oberlin Savings' president, said.

"We can use this information without having to invest heavily in computer hardware, software or an expensive staff to operate and maintain it," he added.

The remote equipment used is an NCR 395-670 data capture unit which includes a Micr reader/forter, processing unit, line printer and card reader.

This processor reads, prints and sorts Micr documents while recording the information on a tape cassette. The cassette is then used to transmit the data to the NCR 251 computer in North Carolina.

On-line CRT terminals with printers are used to retrieve data from the central data base; the printer is available to make a hard copy of information displayed on the screen.

Cost Difference

"The difference in cost between having our own computer and using Profit is tremendous," Campbell said. "We were able to take untrained personnel and teach them to operate the equipment in a matter of weeks. Maintenance of the mainframe and central software is entirely the responsibility of Wachovia Services, Inc. in Winston-Salem."

The Profit system itself differs markedly from a number of other packages on the market. Profit provides a true central information file system with additional accounting, management and marketing capabilities. And its adaptability to electronic funds transfer systems is another plus," Campbell added.

Central National assumes full responsibility for the installation and maintenance of the Profit system and hardware.

The subscribing bank captures and transmits data directly to the main processing unit from an on-premises input station. The information is carried by leased communications circuits to the main computer center where all processing is actually done. The master files are updated and information is transmitted back to

the bank for the generation of printed reports, statements and letters.

On-line terminals are located at teller stations and other key points in Oberlin's main office and four branch offices.

These provide access to the main computer's master file at any time. A paper copy of information displayed on the CRT screen may be obtained whenever desired from an adjacent high-speed printer.

With Profit, funds may be transferred

automatically from account to account following insertion of transfer instructions on the account records. The system, for example, will transfer interest credited to savings accounts or certificates to checking accounts. It will also generate appropriate debit and credit reports without further attention by the bank's staff. This capability permits the system to accommodate the variety of electronic funds transfer applications currently proposed or under development.

Intelnet Network Control System Gets Secondary Channel Option

BURLINGTON, Mass.—Intelnet, Inc. has announced a 150 bit/sec secondary channel option for the company's Network Control System.

The option, which works with all Intelnet modems from 1,200 to 9,600 bit/sec, cuts line costs nearly in half for users who now have 150 bit/sec lines and high-speed lines servicing the same sites in a real-time on-line data network, the company said.

Typical applications include Teletype networks for administrative messages, low-speed printers, security systems and process monitoring.

Line savings of almost 50% are said to be possible. The option frequency-division

multiplexes 150 bit/sec data or administrative messages with high-speed data on the same lines used for high-speed data, thus eliminating the 150 bit/sec lines.

These lower speed lines cost nearly as much as the high-speed data lines, the company said.

If a user now spends \$1,200/mo for voice-grade private lines and \$900 for 150 bit/sec lines, he can save at least \$900/mo (\$10,000/year) by installing a Network Control System with secondary channel.

The cost of the side channel option is less than \$800 with a two-year lease priced at \$21/mo, Intelnet said from 6 Vine Brook Park, 01803.

Talk to us about terminals

(left) AJ 830, the new 30 cps impact printer terminal which features quality and reliability.
(below) AJ 841, the rugged Selectronic™ printer terminal. A cost effective replacement for the IBM 2741.

(right) AJ 230, a mobile acoustic teletype terminal. (Also available in auto-answer and TWX/DDD versions).
(below) AJ 630, a 30 cps quiet non-impact printer terminal with 140 character print line. (APL is an option).

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- AJ 630 A solid state, non-impact printer terminal that offers a 140 character line plus fast, quiet operation. - AJ 830 A new 30 cps impact printer terminal built into a mobile stand.

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Space to Work

LMSFORD, N.Y. A workstation designed for the Teletype Dataspeed 40 series of keyboard displays and printers has been developed by MCS Designs, a subsidiary of Mini-Computer Systems, Inc.

The Deskware unit is said to place the operator closer to the keyboard, which is recessed, and provides a broad wing on which to place work materials as well as a shelf for storage of paper, pocketbooks, etc.

For Dataspeed 40 users without the optional printer, there are work areas on both sides of the keyboard.

The Deskware workstation is priced at \$220 from Mini-Computer Systems at 525 Executive Blvd., 10523.

IBM 3416, 'Magna Carta' Serve 34,000 Clients

BELLEVIEW, Ill. - Customers at the First National Bank here can automatically get cash and perform other bank transactions through an IBM 3416 terminal.

The bank is said to be one of the first commercial banks in the nation to process customer transactions with the 3414 consumer transaction facility.

Using a magnetic stripe identification card, customers can withdraw funds from their checking and savings accounts, as well as check balances in those accounts. Additional features being added later this summer will include the ability to make deposits and transfer funds between accounts.

To use the 3414, a customer inserts his card into the terminal, which is linked to a 370/135. After the card is validated, a display panel instructs the customer to key in a personal identification number. Guided by messages on the display, the customer presses a series of keys to indi-

cate the transaction and its amount.

Some 34,000 customers of the bank are eligible to use the service via a specially designed card known as the "Magna Carta." The dark blue card is embossed with the customer's name and a special account number.

"Considerable thought was given to the

Terminal Transactions

selection of the name for the card," G. Thomas Andes, executive vice-president, said. "It is hoped the Magna Carta card will be used by other banks as they enter the electronic funds transfer banking network, therefore allowing an interchange of bank cards on automated teller machines some day.



To use the IBM 3414 at the First National Bank, a customer inserts the Magna Carta magnetic stripe card into the terminal, which is linked to a 370/135.

"The 3414 is simple to operate, and a customer can transact business quickly," Andes said. "The facility also helps eliminate paper work, which is beneficial both to customers and the bank."

"Customers don't have to spend time filling out withdrawal slips and stand in line for a teller. Our staff has that much less paperwork to handle and in this business, that's important," he said.

CCMI Data Base Has Toll Telephone Prices

RAMSEY, N.J. - For communications users planning or upgrading their networks, the Center for Communications Management, Inc. (CCMI) has developed a data base for toll phone rates and Wats evaluation/analysis.

Each of the 29,000 rate centers in North America and the Caribbean are identified on IBM-compatible tape for users to run on their in-house CPUs.

The basic rate center tape file includes the world numbering plan for identification of directly dialed calls. These are organized sequentially according to area code and central office.

Each central office and area code record contains applicable V and H coordinates, time zone codes, rate center name and country identification. The 9-track Ebcidic tape is arranged sequentially by area codes and central offices and is available in either 800- or 1,600 bit/in. format.

The data base is updated at regular intervals to keep track of rate center changes. The data base tape costs \$225. Updates cost \$200 semiannually, \$150 quarterly or \$100 monthly from CCMI at Box 324, 07446.

Azurdata Collection Unit

Lighter Than Three Pounds

RICHLAND, Wash. - Azurdata, Inc. has introduced the Infopac 1½ portable data terminal.

The portable terminal is self-contained and includes a battery pack. It weighs less than three pounds and is hand-held.

The 4K-character capacity memory is solid-state and can be expanded in increments up to 64K characters.

A built-in keyboard provides function keys and numeric and special character data entry keys. Entries can also be made with an optical wand-type reader.

Entered data is shown on an LED display for verification and correction, if necessary, before advancing to the next and blank unit record.

Among other "user-requested" features are a built-in auxiliary power supply to protect against loss of data in memory, variable record lengths, error prevention features with audible alarms, remote data input capability and fast dump capability.

Price of the standard data terminal is \$1,350 with a one-year warranty. The firm is at 1305 Mansfield Ave., 99352.

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Stores Users' Specs in Data Base

Bell Canada Initiates Dataroute Maintenance Programs

ST. JOHN'S, Nfld. — The Computer Communications Group of Bell Canada has initiated several maintenance programs to keep its digital Dataroute and other customers in operation, according to Brian Hewat, assistant vice-president for systems, who spoke at a recent regional conference here of the Canadian Data Processing Management Association.

With a new trouble report information-handling system, Bell Canada has computerized all of the system design specifications for major users and has stored them in a data base.

It is now possible, literally at the press of a button, to call up on a CRT screen the relevant information regarding a particular system, in any one of a number of locations, making it easier to diagnose and fix a problem, Hewat said.

In addition, the Dataroute alarm reporting and control system allows automatic monitoring and pinpointing of problems on the network. In some cases, problems have been discovered and diagnosed before the user was aware of them, Hewat said.

The next step in Canadian digital network offerings will be the Datapac packet-switched network scheduled to begin operations in mid-1976.

Packet Mode Foremost

There will be a number of modes of operation in the Datapac network, but the prime mode will be the packet mode. Packet switching is best described in comparison with circuit switching, in which there is a physical link between the two ends of a communication for the

duration of that communication, Hewat explained.

In packet switching, there is no permanent physical link. The data is broken up into standard-format packets, which are sent through the network to their destinations by means of special address codes.

Error-checking protocols are built-in, checking the accuracy, every step of the way and automatically ordering instant retransmission if there is an error. This results in a level of accuracy not obtainable before, he said.

The Datapac network is designed to become the universal network for data communications, much as the telephone network is for voice communications. As with the telephone network, it will be a shared network, available on a fee-for-use basis.

The economies of such a network are readily apparent, Hewat said. With many users sharing the system, costs to each will be considerably lower than if they had their own private networks.

End of Waste

One common network will eliminate the "wasteful proliferation" of private networks, many of which span the same areas and undertake similar functions, but are in use to only a fraction of their capacity, he said.

In addition, a shared network can afford the diagnostic equipment, the standby equipment and the alternate-routing capability to ensure full reliability. These would be possible, but very costly, on a private network, he noted.

Perhaps most significant is the fairly obvious need for interconnection of private networks in the years to come, Hewat said. We know for instance, that Canada is moving towards an integrated electronic funds transfer system. This can only be done with some integration of the networks used by each of our financial institutions.

"Joining together a number of private networks is not the way to do it efficiently. The development of one common network is the way to do it, both efficiently and economically," he predicted.

Sycor 250 Expanded With Control Station

ANN ARBOR, Mich. — Sycor, Inc. has expanded its on-line Sycor 250 intelligent display system by adding a control station which incorporates a control unit and a display station in a single enclosure.

The Sycor 258 control station is less expensive than a comparable Sycor clustered display station with an independent control unit, the company said.

An optional device adapter may be installed in the Sycor 258 to expand support for up to 23 display stations and printers using daisy chaining or 12 devices using point-to-point cabling.

The Sycor 258 control station is priced at \$172/mo on a one-year lease, including maintenance, for a 480-character display station.

This compares with \$219/mo for a 480-character display station and independent control unit. The purchase price of the 480-character unit is \$5,400.

The price of a 1,920-character control station is \$233/mo on a one-year lease, including maintenance, compared with \$273/mo for a 1,920-character display station and controller.

The purchase price of the 1,920 character unit is \$6,700. Deliveries for the Sycor 258 control stations are expected next January from the company at 100 Phoenix Drive, 48104.

Sanders Booklet Provides

Introduction to SNA, SDLC

NASHUA, N.H. — An introduction to IBM's Systems Network Architecture (SNA) and Synchronous Data Link Control (SDLC) is available in a booklet from Sanders Data Systems.

The handbook describes what SNA is, what its components are and some of its benefits and drawbacks, according to Sanders.

The information is designed to aid the user in evaluating the applicability of SNA to his teleprocessing requirements and includes a glossary of SNA terms, Sanders said.

The booklet is available for \$1 from Sanders Data Systems, NH 14001, 03060.

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For 370/135 Under DOS/VS

User Finds Independent's Memory a Temporary Solution

MARTINVILLE, Va. — An independent vendor's add-on memory proved to be an interim solution for an IBM 370/135 user here running under DOS/VS.

Although the additional memory was only installed in April, Tully Corp. has decided it needs both "horsepower" and more memory and will upgrade to an IBM 370/145 in October.

Tully, an apparel manufacturer, had been running three or four partitions on its 256K 135, recalled James H. Ferguson,

son, information services manager.

But the firm wanted to add a data base management system and remote job entry (RJE) capability, Ferguson said.

The firm was also interested in expanding its on-line inquiry use of IBM 3270s to on-line order entry.

Even without the additional load, though, the 135's high paging rate was an indication the CPU didn't have enough memory for its current workload.

Although the firm came to the conclu-

sion that memory, not horsepower, was what it needed, "we also suspected we were out of cycles and . . . ought to have a faster machine," Ferguson said.

But, "the economic situation was such that we didn't want a larger machine unless we had to," he remarked.

"If you have a high paging rate, it's difficult to measure your CPU utilization or what it would be if you had enough memory," he observed.

The shop's 135 had originally had

144K, but had grown with two additions of IBM add-on memory. The latter step had carried the CPU up to 256K with installation of IBM's Advanced Bipolar Memory (ABM).

Lower Cost Alternative

The IBM add-on memory had been "excellent," but the shop was concerned with price and decided to keep looking for a lower cost alternative for its latest memory requirement.

Tully finally chose an upgrade from 256K to 384K with Memorex 6135 add-on memory. Tully leases the memory from DPF, Inc. of Hartsdale, N.Y., at a rate about 44% less than the comparable IBM price, Ferguson said.

"It took about a week and a half to get the memory up properly," Ferguson recalled. "It looks right in the IBM error correction logic," he said. "There were some single-bit and double-bit errors for a while, but they are gone now," Ferguson said.

The shop noticed a throughput gain because paging was no longer a factor and is not a factor now," Ferguson said.

Tully was able to implement the on-line data entry system with 10 CRTs running under the IBM Customer Information Control System (CICS). The 135 also provides a partition for RJE usage and provides two batch-testing partitions during the day.

At night the shop runs two or three production partitions, handling financial and inventory applications, Ferguson said.

Run Out of Cycles

After putting on the additional applications, the shop found it had indeed run out of cycles. Because it both needs the capacity and has plans for more applications, the firm plans to lease a 512K IBM 370/145 in October.

The 145 will come from Computer Systems of America (CSA) in Boston, where Tully leased the 135. The Memorex add-on memory will go back to CSA with the 135.

The Memorex add-on memory has proved "fine" in terms of reliability and service, Ferguson said. Tully already had Memorex servicing six spindles of Memorex 3330-compatible tape.

The shop also has six IBM 3420 tape drives. IBM maintains the CPU and the drives, and Memorex takes care of the add-on memory and disks, Ferguson said.

DP Aids Newspaper Payment Collection

WASHINGTON, D.C. — The toughest problem for newspaper carriers is collecting from customers. The biggest headache for customers is paying carriers. And publishers worry about the competition of carriers' problems and customers' headaches.

The Washington Star-News said it is going to do something about the situation. It is giving customers a chance to pay computers instead of carriers.

In an average month, the Star-News said it loses about 300 of its 6,000 carriers, primarily because of collection problems. Furthermore, the paper noted this 5% turnover rate is probably typical of most big-city dailies. On the other hand, the vast majority of customer complaints are about carrier delivery and collection, the Star-News said.

Computers can help to solve the problem, said Harold Lowder, director of data processing for the Star-News. He said his publication has computerized what it calls "preferred customer accounts" so subscribers can make payments directly to the Star-News and have the collections automatically processed and recorded.

Eliminating the Problem

"There's nothing new about letting subscribers pay directly to the paper instead of to the carrier," Lowder said. "But every paper that does it considers it a problem. We're trying to eliminate the problem."

The Star-News systems permits subscribers to start a preferred customer account by paying the paper directly for a minimum period of eight weeks in advance. Thereafter, customers receive bills at regular intervals.

If a customer stops delivery for vacation, or reports undelivered papers, his account is credited automatically. Carriers don't have to collect from preferred account customers but they still earn their customary delivery fee of 5.5 cents for each daily paper and 10 cents for each Sunday edition.

Records for preferred account customers are stored on a Honeywell Model 2040 computer system in the Star-News building here. When customers call to make inquiries or request changes in service, clerks in the accounting department have immediate access to the records on a CRT terminal. Operators can check a customer's last six transactions, details of his most recent billing and the history of delivery stops and starts.

Quicker Answers

The system has improved customer relations considerably, Lowder said. "Before we began using this method, our subscribers became very frustrated and irritated waiting for us to check their records. Every time they called to ask a question, we had to hold them on the line while we searched one of our files. Now we get the information while we're talking to them."

Lowder said the Star-News expects that increased use of the preferred customer account by subscribers will reduce the turnover rate for carriers. In addition, he pointed out that advance payment gives the paper more cash with which to defray operating expenses, improves customer satisfaction and provides a competitive edge which may help the Star-News attract new subscribers.

The system will be even better in another month or so when the Star-News transfers its complete preferred customer records from computer tapes to disks, said Lowder. He said operation will then be able to correct and update customer records at the same time they check billing information.

The Star-News has about 20,000 of its 300,000 home-delivery subscribers in preferred customer accounts. The computer is capable of handling as many as 100,000 customers and, by upgrading the system, Lowder hopes to have at least half the total 407,000 circulation (including newsstand customers) paying directly to the Star-News.

"There are great advantages to the preferred customer account system. It takes modern computerized system to make it work," Lowder said. "We've offered the service for a long time, but it was a problem for us and our customers until we got the right system in place."

From Cards to CRTs

Ten years ago, Lowder said, the Star-News handled preferred customer accounts with "thousands of computer cards." The only information available was a customer's name, address, delivery schedule and balance. Other details were kept in special files and record books.

Since then, the Star-News has steadily

upgraded its DP operation and improved its ability to serve preferred customer accounts. An IBM system purchased in 1961 was replaced by a Honeywell Model 200 in 1966. Two years later, processing was changed from cards to tape to increase speed. A Honeywell Model 1200 was installed to handle the job. Then, in 1972, the Star-News changed from a monthly to a weekly billing cycle. Finally, the Star-News upgraded to a Honeywell Model 2040 one year ago and converted to disk files last March.

Better Service

"The primary motivation in upgrading was to improve preferred customer account service," Lowder said. "We've convinced the problems can be solved and we believe this is the system to solve them."

The Honeywell system consists of a Model 2040 central processor with 1,000 characters of memory, four vital information projection terminals, four tape drives, three disk drives, a printer and a card reader/punch.

The Star-News uses the system for a variety of other applications besides preferred customer accounting. It is used by the accounting department for payroll processing, accounts receivable accounting, advertising billing procedures, market research surveys and classified advertising accounting.

In addition, the circulation department uses the computer for updating weekly delivery schedules. A political reporter even uses it to analyze election results.

"Variety is a key element in our DP operations," Lowder said. "We need to do several kinds of processing jobs, and this system gives us the flexibility we need."

applications such as utility bills.

The continuous-feed enhancement should allow the 2250/1 to process 3 in. by 6 in. turnaround documents at the rate of 400 document/min compared to a previous rate of about 150 document/min, a spokesman said.

Continuous feed is a combined hardware and software function which allows paper feeding to continue at a rate of 30

vertical in./sec. In the event that scanning cannot keep up with paper movement, the continuous-feed feature momentarily stops the paper, then automatically restarts it at the proper time.

The programming of the feature is "transparent" — a user states by simple parameter entries where data is located on each form, and the continuous feed option combines hardware and software operations to read the data in sequence as the paper passes.

The continuous feed option and the firm's 1,600 char./sec scanner option have a combined three-year monthly lease rate of \$450. Maintenance is available at \$150/mo.

The continuous feed option can be field installed and will be available in the first quarter.

The general numerics recognition capability has a three-year lease rate of \$180/mo. Maintenance is \$30/mo. Availability is also in the first quarter from the firm at 800 E. Main St., 19401.

Two Opins Enhance Scan-Data 2250/1 OCR Unit

NORRISTOWN, Pa. — A continuous-feed option is said to enhance the ability of the Scan-Data Corp. 2250/1 optical character recognition (OCR) unit to process very large volumes of small documents having only one or two lines of data.

Scan-Data also announced an optional general-graphics recognition capability which reads the common line printer numeric character sets. The feature is said to be especially useful for turnaround

OCR User Group Elects Officers

BOSTON — The Optical Character Recognition Users Association (OCRUA) elected A. Blair Jensen of Management Systems Corp. in Salt Lake City, Utah, as its 1975-1976 president at the group's recent summer conference here.

OCRUA is an association of users of optical scanning equipment.

Also elected were the following officers: Darol Alexander, Travelers Insurance Co.,

Hartford, Conn., vice-president; William W. Dwyer, Data Entry Systems, Inc., Morrisville, Pa., treasurer; and Robert Guida, Blue Cross of Massachusetts, Boston, secretary.

The association's winter conference will be held Jan. 12-14 at Mountain Shadows in Scottsdale, Ariz.

OCRUA is at 505 Buse Highway, Park Ridge, Ill. 60066.

Bank Saves Time, Too

As Paper Costs Climb, COM Savings More Significant

INDIANAPOLIS, Ind. — "Our decision to go to computer output microfilm



This microfilm unit transfers data from magnetic tape onto encoded 16mm microfilm.

(COM) encoded for fast retrieval... seemed to be a cost-effective measure that would bring us in step with current trends in the DP field.

"But as paper costs skyrocketed, our savings became much more significant," according to R. Michael Ahern, a DP officer with Merchants National Bank and Trust Co. here.

The bank, using COM-generated microfiche instead of conventional paper printouts, along with encoded rolls of microfilm, trimmed an estimated \$70,000 in paper costs and saved 9,555 hours of computer time during the first six months of operation, Ahern said.

There are three primary uses for COM at Merchants Bank.

"All reports, except the daily exception reports, are produced on microfilm,"

Ahern explained. "Our biggest runs are in trial balances for different areas of our operations. For demand deposits, the report, printed on paper, amounted to 4,000 pages a day, stood two feet high and required 7½ hours to print. The same information can be generated on microfilm in 25 minutes from the time the computer tape is loaded until the 17 microfiche masters are produced."

Merchants Bank's Kodak KOM-80 microfilmer uses a 424-to-1 reduction ratio to produce masters from which circulating duplicates are made. Original microfiche remain in the data processing library.

"Our reports fall mostly into the very high-volume, very low-activity category," Ahern said. "Having them on microfilm is extremely important to us in terms of storage and production time. Many of our

correspondent banks, for whom we do data processing, have very limited storage areas, which are normally inundated with stacks of paper printout. Now, they can have the same material in a usable form near the person who needs to use it."

Bottleneck Eliminated

A second application for COM is the creation of archival storage of documents such as demand deposit account statements. In the past, documents were filmed using a Recordak Rotoline microfilmer.

"The old procedure added an additional mechanical step to our operation," Ahern



A bank staff member can use this retrieval terminal to quickly access data stored on the encoded film magazines.

said. "Now, we've eliminated a clerical bottleneck and produced some labor savings."

The third COM application involves use of an automatic key index system that eliminates manual searching for microfilm records.

"Very few banks have their trust department accounting entirely on microfilm," said Gary Kyle, trust department assistant operations officer at Merchants Bank.

10-Second Retrieval

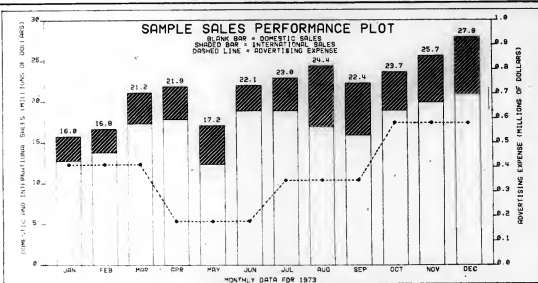
Efforts to automate accounting began with on-line data entry direct from the trust department to the bank's IBM computer. From there, output goes to the microfilmer which produces microfilm encoded for high-speed retrieval. With all the account information stored in plastic magazines containing encoded film, retrieving reports takes as little as 10 seconds, he added.

"We looked at a number of different data-entry methods," Kyle said, "including key punch, magnetic tape, optical character recognition, and on-line CRTs. We decided that, based on cost and time factors, on-line data entry would be faster and less expensive."

"From there, our problem was what to do with the computer output. We started with paper, but soon found storage was extremely difficult. We'd already been putting our old records on microfilm, so we looked at what COM could do for us," he explained.

Studies showed that COM-generated microfilm, in combination with Kodak Miracode II retrieval terminals, was a good method for retrieving the bank's

(Continued on Page 25)



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Selling a 370/155?
Order a DAT Box

ENGLEWOOD CLIFFS, N.J. — Users who are considering selling or subleasing their installed IBM 370/155s should place a Dynamic Address Translation (DAT) Box on order as soon as possible, according to the recommendation of IPS Computer Marketing Corp.

The DAT Box permits use of the 155 as a virtual machine, and most buyers in this price range are interested only in virtual machines, the used equipment firm said.

Fire Prevention Guards Against Costly DP Downtime

By Mervyn Gould
Special to Computerworld

Computer downtime is a concern that arises in memos and late-night worries about the cost/productivity ratio. Yet one source of potential downtime is seldom discussed — what happens when a fire disrupts DP operations.

On the surface, there's good reason for focusing on the more routine problems. Certainly the computer and tape storage room don't look like fire hazards.

Yet appearances in this case are deceiving. For the labyrinth of wires and electrical connections essential to DP operations can constitute a potential hazard. At stake, at best, are hours of downtime, disruption of normal procedures and costly rehabilitation of the premises.

Far worse, however, is the resulting impairment of customer accounts, inventory records and analytical and sales data that can occur when reels of tape are destroyed.

What makes the DP area particularly vulnerable to fires is that personnel may not even know one has started until major damage has occurred. This can happen because DP power sources are largely hidden from view.

What User Can Do

What can the user do to protect his DP center?

First, educate all personnel to potential hazards. This instruction may include "good housekeeping," checking all equipment at the end of the shift, taking responsibility for closing doors to the tape storage area, learning to use fire

extinguishers and determining evacuation procedures.

Get to know the fire hazards of the computer area. Fires may start right in the computer. Boards, liners, insulation and plastic harnesses are all combustible. Or fire may start in the computer service cables running under a raised floor, out of sight.

Inspect these areas periodically, as fire-involving waste material and dust often accumulate here. When a blaze does occur in these concealed and confined areas, heat develops rapidly, igniting even fire-retardant insulation.

Fire may also start in motor-driven fans, filters, air conditioners, mechanical and hydraulic controls, overheated incandescent lamps, fluorescent lamp ballasts and other electrical equipment. No malfunction in any of this equipment should be ignored.

A survey of the facility by insurance

underwriters and by experienced protection engineers is also advisable.

One of the most effective means of avoiding downtime and damage is an engineered extinguishing system which detects fire in the first crucial seconds and automatically delivers a knockout punch before the fire can cause a major calamity.

For example, a large financial institution protects its 26,000-square-foot DP area with a Halon 1301 "total flooding" system.

Upon sensing particles of combustion, ceiling and underfloor smoke detectors transmit a signal to a bank of steel cylinders where Halon 1301 is stored under pressure. At the same time, an alarm sounds warning personnel to leave the protected area.

After a few seconds delay, which permits clearing the area, the cylinders are released. When released, the stored pressure acts

as a propellant and directs the Halon 1301 gas through piping to discharge nozzles located in the hazard areas. The Halon then builds up an inert atmosphere in the immediately surrounding area and extinguishes the fire.

The Halon 1301 does no damage to either the electrical wiring or the equipment. Because the gas has no "wetting effect" on insulation and is not a solvent, no dry-out period is required, nor is there any corrosive effect. A heavier-than-air gas, Halon 1301 flows around obstacles, saturating the entire protected area. After its work is done, it disappears.

The important points, again, are to employ the full extent of preventive measures and then install a fire-protection system that will work for you automatically in time of need.

Gould is product group manager of fire protection systems at Walter Kilde & Co., Inc.

COM Savings Increase As Paper Costs Climb

(Continued from Page 24)

accounting records that required daily reference, Kyle said. The encoded microfilm saves space, reduces costs, is retrieved faster and serves as a complete backup for all information on file.

Of the 3,400 trust accounts at Merchants Bank, about 2,700 are considered active. Seventy persons at the bank review accounts daily, averaging 110 references a day. The checking of accounts, which formerly required up to 15 minutes, now takes just a fraction of that time.

Merchants Bank's microfilm generates microfilm for the department's account cash ledger, account security ledger, account control ledger and the security control ledger. Some reports are produced daily; others, monthly.

All ledgers are referenced by a 10-digit number. Either the account number assigned to each account or a number assigned to assets such as stock certificates and bonds may be used.

In addition to "20 to 25 times faster" retrieval, file security is more complete, Kyle said. "Paper files can get lost or misplaced," he noted. "The microfilm magazines stay in a cart by the retrieval terminal and can be wheeled into a fire-proof vault."

There are four sets of film files in separate magazines — one for each of the ledgers. The magazines are labeled with beginning and ending numbers of the accounts in each and by the type of report contained. Duplicate records are kept so that a given security can be referenced by account number or under the 10-digit code for that security.

All records not stored in magazines are kept on microfiche. No paper records are in the trust department, except for the copies printed for immediate use.

The trust accounting method at Merchants Bank has generated so much interest that the bank is marketing the technique through R. Shriver Associates of Parsippany, N.J.

From Source to CPU

A special supplement on Source Data Entry - In the October 29th issue of Computerworld.

What used to be the exclusive domain of the keypunch operation has become the object of a confusing mass of systems, varying from card punch to OCR to distributed data entry and new, hybrid systems. This special supplement, edited by Vic Farmer, will analyze the many data entry applications in use today. Special emphasis will be given to capturing data at the source. It's projected to be the biggest CW supplement of the year, and it will be filled with applications stories, tutorials and viewpoints from users and experts on data entry. You'll see articles on subjects like these:

- Key-to-disk and key-to-tape
- The effective use of turn-around documents
- On-line data entry
- Terminal systems
- Distributed data entry
- Customized turnkey systems
- Optical Character Recognition systems
- New "Hybrid" systems - combinations like OCR and keypunch

If you're involved in the data entry process at your organization you should key in to this special supplement in the October 29th issue of *Computerworld*. And if you're a marketer of data entry products or services, your ad should be there. Don't miss the October 10th ad closing date. Contact your *Computerworld* salesmen for complete details. Or call Judy Milford at (617) 965-5800.



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our peripherals like files. Which makes our files device independent. And a lot easier for you to use.

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And you can use any combination of disc drives. So you can manage files from one to one billion bytes and match your file handling to your application.

Yet with all the flexibility we give you, we don't demand a lot in return. You can get an Eclipse S/200 system with 48K bytes of core and a 10 megabyte disc file for under \$30,000. (quantity one, list price.)

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You may end up buying our computer systems because of the way we handle your files.

DataGeneral

Data General, Route 9, Southboro, Mass. 01772 (617) 485-9100. Data General (Canada) Ltd., Ontario, Data General Europe, 15 Rue Le Sueur, Paris 75116, France. Data General Australia, Melbourne (03) 82-1361/Sydney (02) 908-1366.

Miniworld Products

Single-Board Disk Controller Fits Different Disks to Novas

ANAHEIM, Calif. — A single-board controller from Western Peripherals Corp. (WPC) accommodates both multiple single-platter drives and cartridge-type single- or multi-platter drives for use with Data General Corp.-type computers.

The WPC DC-220 universal disk controller is said to be completely software-compatible with all Data General Nova and Eclipse series computers, as well as Digital Computer Controls DCC-116 and Kernex, Inc. minicomputers.

Plugged into the DC-220 control drive units or cartridge drives. The DC-220 controls as many as four single-platter cartridge drives, two dual-platter drives, two single-platter drives with 406 tracks per surface or a single dual-platter drive with 406 tracks per surface, the firm said.

The computer sees multidisk platters as though they were from separate drives. Automatic

seeking of the desired track is performed by simply issuing a DOA command, the firm said. Address verification formatting is standard as a validity check on drive seeking. Every sector has its own address verification which allows data to be processed without having to wait for the disk to rotate past the index point.

With cartridge drives, data on the cartridge is media-compatible with the Data General cartridge. Disk rotation is selectable 1,500 or 2,400 rev/min.

Complete disk memory systems are available. Designated DS-220, these systems consist of the DC-220 disk controller installed in the computer (supplied by the user) and a specified disk drive or drives which may be ordered from WPC.

Price of the DC-220 universal disk controller is \$2,500. The firm is at 2893 E. La Palma Ave., #2806.

Memory Serves PDP-9, PDP-15

LAKE SUCCESS, N.Y. — High-speed, plug-compatible semiconductor memory from Dimensional Systems, Inc. (DSI) is now available for Digital Equipment Corp.'s PDP-9 and PDP-15 computers.

These memory systems feature a cycle time of 450 nsec, as fast as the equivalent core memory, the firm said.

The semiconductor memory is about twice as compact as core. 128K of memory and interface requires only 10-1/2 in. of panel

space.

Memory is supplied in 4K by 18 bit increments with 32K by 18 bits on each plug-in board. Memory chips as well as logic integrated circuits are mounted in plug-in sockets for field replacement. The semiconductor memory of the static type so power failure data retention circuitry can be a very low-power-consumption battery power supply.

A typical 16K by 18 bit system is priced at \$7,700. The firm is at 6 Nevada Drive, 11040.

Harris Offers 64K PDP-11 Add-On

FORT LAUDERDALE, Fla. — Harris Computer Systems has introduced an add-on core memory system for the Digital Equipment Corp. PDP-11 that is field expandable from 16K words to 64K words.

Called the Harris 3811, the system has a 650-nsec cycle time and contains features such as parity generate and check, a fault-sift circuit and memory protect. The system is Unibus-compatible

and presents one Unibus load.

The Harris 3811 contains a dedicated power supply and timing control board. The unit is expandable from 16K to 64K in 16K increments and is available in a 16-bit configuration or an 18-bit configuration for parity systems.

The 3811 is priced at \$9,000 for the full 64K configuration. The firm is at 1200 Gateway Drive, 33309.

FORT LEE, N.J. — After nearly two years in the planning, the Minicomputer Industry National Interchange (Mini) has been chartered as a nonprofit association.

Mini is a professional association which said it will concern itself with all areas of minicomputer systems, equipment, software and techniques. It is structured to accept individual members, corporate user members and manufacturer members.

The goals of the organization are said to be to:

- Provide a forum where new ideas, concepts, equipment and techniques and other appropriate matters can be examined and discussed by knowledgeable and interested professionals and where these persons can establish criteria for communication within their field.
- Provide a mechanism for the exchange and interchange of minicomputer experiences.
- Provide a central source where actual and potential minicomputer users and other interested parties can turn for information and assistance.
- Establish a meaningful dialogue between manufacturers and users.

Although Mini plans to eventually support special interest subgroups dedicated to all areas

of interest to its membership, the initial subgroups will cover minicomputer architecture, operating systems and languages, business DP and telecommunications.

To aid in the distribution of minicomputer information, a formal requirement of each chapter will be to provide a free and open tutorial at about every other regular meeting. To further advance the minicomputer industry, the association plans special committees to coordinate with applicable sections of their professional and trade organizations and the trade media.

Initial sponsors of the group, required for its incorporation, represent several minicomputer manufacturers, corporate users and systems houses. The group has as its president Protem John David, head of Systems RDI Corp. and founder and former chairman of the Association for Computing Machinery's Special Interest Committee on Minicomputers. Protem vice-president is Steve Mandell, assistant director of the ADP Management Training Center of the U.S. Civil Service Commission in Washington, D.C.

Mini headquarters has been established at 2460 Lemoine Ave., 07024.

Off-Line, On-Line System Handles College's DP Services Economically

TIFFIN, Ohio — Heidelberg College is finding that a minicomputer can economically provide the full range of research, educational and college administration services required for its entire campus — often simultaneously.

While one student designs the lighting for a stage production, communicating with the computer through a display terminal, a faculty member may be running a campus payroll, while another student is studying river pollution, requiring hookup to a remote larger computer for special application programming.

At the same time, the college's treasurer may be on-line to the processor in connection with the campus payroll, while another professor may be processing data in a batch-processing mode.

According to Dr. John J. Jakobs, computer center director, the Heidelberg College computer facility here not only provides the gamut of DP services, it offers students an open-ended environment that permits them to gain valuable hands-on experience.

"In the open shop, the students perform all the tasks necessary for getting their jobs done. They operate the machine itself, push the buttons and get a much better feel for the computer than by giving their punched cards to a secretary and getting the output back through the campus mail, as so often is the case on the larger campuses that have large insulated computer centers," said Jakobs.

Computer education here is treated as an adjunct to the other disciplines taught at this liberal arts school. After taking the first course in Fortran — the main programming language used with the 32K Varian Data Machines V72 computer — and an advanced course in programming, students then apply the computer technology to any special projects in which they are engaged.

Designs Lighting

A theater arts student, for example, is developing a program that will enable him to interactively design the lighting for theatrical productions using a

CRT terminal. He hopes to use the computer to save many hours of work in setting and resetting the intensity and location of the lights by having the computer help.

The program is also expected to ensure the capacity of the electrical circuits is not exceeded.

River Study

Faculty research now under way includes a river study conducted by the biology department and sponsored by the Environmental Protection Agency. The computer produces plots of river load concentrations vs. distance downstream or time. Eleven students are assisting on this project, while educationally benefiting from the experience.

Meanwhile, the college's treasurer is using on-line terminals located in his office to perform general ledger, student accounts, accounts payable, check writing and payroll functions. The treasurer's office communicates directly with the computer and is thus fully responsible for its own data inputs.

Dedicated Unit Simplifies Constant Price Changing

WASHINGTON, D.C. — With prices changing almost as fast as faces in a Hollywood marriage, one Washington, D.C. area firm has found the ideal solution for coping with rapidly changing government requirements: the minicomputer.

Rexford A. Davis, president of Chesapeake Petroleum and Supply Co., Inc., distributors for Quaker State Motor Oil said, "We have an unusual pricing situation because we do business with the Capitol Area Defense Center that does the local buying for military installations. But the pricing structure is determined by the government and Quaker State.

"Nearly every month we get a new price list with thousands of changes. And we must know how much of each item we have in inventory — and at what price."

About seven months ago, the firm installed a Basic/Four Corp. minicomputer in order to have instantaneous information. When the new lists arrive, the changes are made as fast as they can be typed into the computer.

Twice as Efficient

"The new equipment is twice as efficient as the ledger cards we were using. When a change was required before, it meant switching the infor-

mation on the magnetic stripe on each card. There's no question it was a more time-consuming, bulky and less efficient method.

"The old approach involved locating each ledger card, pulling it out, putting it into the machine, making the necessary changes, putting it back into the file in its proper place and then finding the next one," he explained. "If you want to make a price change on ten items, for example, the present system can do it in less than a minute."

The Basic/Four system handles the company's total invoice function involving 10,000 numbers. The equip-

ment produces product inventory, trial balances, comprehensive sales analysis, commissions, accounts receivable, cash receipt journals, daily sales reports and individual customer analysis. Accounts payable will be programmed next.

"There are many advantages to using a minicomputer," Davis noted. "We've been able to reduce our inventory on hand by more than half. And we are able to expand our sales without adding more people to handle the accounting function. In fact, it has released our present staff to do more important tasks. Moreover, the downtime on the minicomputer has been negligible."

Learning of Handicapped Studied

MANCHESTER, England — A minicomputer is being used by one of the research teams at the Hester Adrian Research Center here to assist in investigating the learning abilities of mentally handicapped children.

The long-term aim of the research is to provide teachers of such children with information which will enable them to develop their pupils' abilities more fully.

The research team using the Data General Nova 1220 is investigating some of the ways in which mentally handicapped people learn. The computer is installed in a mobile caravan, which also contains a small laboratory area.

The laboratory area contains a small, TV-like screen on which pictures or symbols can be displayed and a lever and hatch similar to those on a chewing-gum machine. These can be made to distribute sweets or small toys as "payment" for the child's recognition of a particular symbol displayed.

Pulling the lever on the wrong stimulus causes either a buzzer to sound — or no reward to appear. By varying the number of symbols, the number of times the lever must be pressed to obtain the reward and other factors, the complexity of the experiment can be increased and an assessment made of the child's sensitivity to rewarding or nonrewarding events.

The apparatus is connected on-line to the mini, which is equipped with a high-speed paper tape reader for reading in programs and a high-speed punch which records the results of the experiment as they occur.

These results are also recorded graphically by a pen recorder, providing an immediate guide to the results of the experiment, while the paper tape preserves the data in a form suitable for subsequent analysis.

The Nova is programmed in ACT-N, a specialized language designed for use by psychologists. Using this, the parameters of an experiment can easily be established and altered, even while the experiment is in progress.



Various points on the X-ray of the mouth are traced on paper and then input to the system.



Projected display demonstrates what would happen at the orthodontist's trim different methods to correct a dental problem.

Graphics Approach Aids Orthodontists

FARMINGTON, Conn. — Staff members here at the University of Connecticut School of Dental Medicine have developed an interactive graphic approach to offer the orthodontist a CRT presentation of the potential changes in growth patterns as braces, arches, wires and other orthodontic appliances are administered.

Based on this data, the best treatment plan for the patient can be determined. The output also helps in designing the proper appliance to be used. The tablet saves time by eliminating the need for keyboard entry of numerical X-Y position values. Additional cost reductions are achieved by eliminating manual orthodontic calculations.

On stylus press-down, X-Y coordinates values are presented to the computer. These points are connected and displayed as an outline of the face and teeth.

In operation, the first step is to take the necessary x-rays and measurements of the patient's head. Tracing paper is placed over the X-ray and key points noted. The tracing is then positioned on the Summagraphics data tablet, illuminated and the key points digitized with the stylus.

The system software analyzes the data and scales it, and a resultant diagrammatic sketch of the patient's face and teeth is displayed on the CRT.

Using the stylus, the operator draws in, on the tablet, dental appliances to be added to the teeth. These sketches and their effect are immediately displayed.

Panafacom 16-Bit Mikro on Display

SAN FRANCISCO — Japan's Panafacom Ltd. is demonstrating its recently announced 16-bit microcomputer system at the Wescon Conference here this week.

Designated the PFL-16A, the system combines essential features found in minicomputers with the price/performance characteristics of microcomputers, the vendor said.

Engineers have implemented all key microcomputer functions on three proprietary chips. The design configuration includes one chip for the CPU and two chips to support a highly efficient I/O structure, a spokesman explained.

Deliveries of the PFL-16A are scheduled for December. Sample chips will be available in October, when prices will be announced.

Mini Handles College's DP

(Continued from Page 27)

This has reduced the workload for the computer center which employs one faculty member and four students.

The alumni office of the college is now gearing up to use the system through a terminal located in its office. The alumni office will keep files on alumni as part of its fund-raising and alumni-relations functions.

Can Connect With 360

Should powerful, large-scale, special application programs be needed, the system has the capability to connect in seconds over a dial-up telephone line, with an IBM 360 at nearby Bowling Green University.

This connection is made possible by virtue of that computer's Haup operating system.

Connecting with the Bowling Green computer, in a remote job entry (RJE) mode, permits Heidelberg's faculty, students and administration to utilize such programs as the Statistical Package for Social Sciences and the General Purpose Simulation Studies when needed.

The minicomputer is capable of connecting, in this same way, with virtually hundreds of large computers around the country. The Bowling Green computer is only 45 miles away and, thus, the long-distance telephone call required is minimal in cost.

According to Jacobs, compared with the predecessor IBM 1130 computer system, the Varian computer is about four times faster in handling the average administrative task; has 10 times the capability in terms of storage, print speed and disk transfer speed; and can process five times as many jobs in the same time.

The advantage in throughput is due to the multiprogramming capability of the mini computer. This feature, controlled by the CPU's real-time operating system, Vortex, allows the computer to perform on-line and

batch-processing functions while simultaneously linking up for RJE with other computers. The 1130 had to stop other tasks when operating in an RJE mode to Bowling Green.

The computer system here also includes a 300 card/min reader, 300 line/min printer, 14.5M-word disk, CRT input console, remote printer, magnetic tape drive (800 bit/in.), incremental plotter and a 16-channel data communications multiplexer with eight lines capacity.

At South Pole, of All Places

Mini Stays Cool Aiding Study of Heat Circulation Trends

DAVIS, Calif. — At probably the world's cleanest, coldest and most uniformly desolate spot, only yards from the bottom of the planet Earth, in Antarctica, scientists have set up shop to study — of all things — air pollution and heat circulation trends. To do this, 35 crates containing the dismantled parts of two identical minicomputers plus spare parts were shipped 9,000 miles from the University of California campus here at Davis. The dismantling was necessary to facilitate handling at the South Pole and to permit the minis to pass through a narrow passageway in the recently refurbished Amundsen-Scott station.

Before the use of these computer systems, experimenters had to lug reams of collected data back to the U.S., not knowing when they left Antarctica whether the data was, in fact, good data. Now, the on-line system produces outputs in real time, allowing researchers to study the results during the experiments.

Flow of Heat

In one experiment scientists are studying the flow of heat energy into and out of the polar cap. According to Dr. John J. Carroll, the vast difference between equatorial and polar temperatures is the main reason for the mass movements of air within the atmosphere.

By knowing the temperature changes at the pole, scientists will be better equipped to make long-range predictions of atmospheric circulation and global weather trends, he said.

The station's primary com-

puter logs data on magnetic tapes and processes it preliminarily. The system consists of a Hewlett-Packard HP 2100S microprocessor, a video display, keyboard console, a line printer and other electronic equipment which interface and condition the signals arriving from the outside experiments.

A second experiment, led by Dr. Kissell L. Coulson, has as its basic premise the fact that the South Pole is one of the world's cleanest places, free of local

pollution.

By periodically measuring pollution levels here, researchers believe they will have a more concrete idea of whether the global situation is worsening and how fast.

The primary computer system at the station is backed up by an identical HP system, which stands ready to go on-line should a malfunction develop in the first system.

Ordinarily the backup com-

puter is used off-line, unburdening the on-line system by performing further data reduction, by separating data collected on tape of various experiments and by performing program development.

A third backup unit consisting of another 2100 processor with 8K memory, CRT console and magnetic tape drive provides an additional source of spare parts.

At the University of California at Davis, the fourth system, identical to the primary South

Pole system, is used to train experimenters who will be setting up research at the pole. It also enables the experimenter to check out the compatibility of his experiment with the processing system in terms of both hardware and software.

In addition, the Davis system allows for remote debugging of its twin at the pole. Solutions to hardware or software problems that might develop can be simulated at Davis and communicated to the pole by radio.

Fixed-Base Aviator Likes System's Man-Hour Savings

BEDFORD, Mass. — A small computer system designed for administrative operations at a general aviation fixed-base operation (FBO) has already paid for itself in terms of saved man-hours.

The system, built around a Digital Equipment Corp. PDP-8/M minicomputer, serves personnel of Tech Aeroervice, Inc., an average of 160 man-hours per week while increasing dispatcher effectiveness.

In addition to providing the status of the facility's aircraft instantly to the dispatcher upon demand, the system keeps inventories, sales, charges and receipts, payroll information, accounts payable and receivable and changes in Federal Aviation Regulations up to date. It even informs Tech's customers automatically when they are due for a medical examination.

The brainchild of William E. Ziminsky, president of Tech, the system is small enough to fit into the main operations room without dominating it. Noting

that a dispatcher's job, while necessary, was both difficult and thankless, Ziminsky said, "When you are running an FBO where several dispatchers may have to take care of a large number of pilots, it's easy to lose control. And you can't afford to do that."

Tailored to FBO

Ziminsky determined a computer would be required to ease the paperwork of his dispatchers. Instead of a conventional business system, however, he directed the development of the system so it would be tailored to problems unique to the FBO.

"The computer system can

determine instantly what the status of an aircraft is or whether the pilot who is requesting it has been checked out in it," he said.

The system, which includes magnetic storage disks and a printer terminal as well as the minicomputer, is capable of handling 2,000 accounts. The terminal automatically prints out the flight record sheet with the information needed to determine rental fees — meter readings and related to the mileage readings recorded when a rental car is checked out — further streamlining procedures and helping to eliminate potential mistakes.

One result of the system is the safety it affords. "We put in all

sorts of guards," Ziminsky noted.

For example, if a student pilot hasn't had a dual-instruction flight within 30 days, he can't check out a plane. "The number of days is arbitrary, but having the records on computer helps avoid slipups."

The computer also informs the dispatcher of the recording hour meters for every aircraft and includes special callouts for aircraft with less than 20 hours.

Ziminsky believes his system is the first designed expressly for FBOs and feels that, in the future, most FBOs will employ equivalent systems because of the increased safety, efficiency and control they afford.

Calif. Engineers' HP 3000 'Gives a Dam'

RIVERSIDE, Calif. — Engineers at the Riverside County Flood Control and Water Conservation District's headquarters here are using a small system to study hydraulic and hydrological

problems and to design such flood-control structures as dams, channels, storm drains and levees.

The minicomputer, installed about a year ago, is the central

element in a computing system used by the district's engineering staff working through CRT terminals. Most of the system's software was developed by the district. About half of the engineering jobs handled by the Hewlett-Packard HP 3000 originate from terminals; the rest are entered from cards. Eventually, about 80% of the system's work load will pass through the terminals.

The Riverside County Flood Control and Water Conservation District was established in 1945 to control flood and storm waters, prevent flood damage and import water from other parts of California. With an annual budget of \$28 million, its jurisdiction embraces 2,736 square miles.

To support the construction, operation and maintenance of this system, the district's engineers perform a variety of computer-aided studies. These include:

- Structural studies to optimize the design of dams, bridges, channels and underground storm drains. Here the HP 3000 determines the stresses borne by bridge members, buried pipes or storm drains under predicted loads.

- Earthwork studies, to determine the volume of earth that must be moved in excavating a channel or building a dam. Here a graphical approach may be used, the computer receives graphical representations of the applicable terrain and of the structure to be built.

The district's system includes six CRT terminals, a line printer, a card reader and a disk drive.

...to get the most out of your computer system. You can't afford to waste time and money on a system that doesn't do the job right. You need a system that's easy to learn, easy to use, and easy to maintain. That's why you need a system that's built for the future. That's why you need a system that's built for the future. That's why you need a system that's built for the future.

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College Trains High School Students as DP Technicians

LOS ANGELES — While the age of computer technology has arrived, the age of computer literacy is lagging far behind.

The general public is, for the most part, unaware of the scope and role of computers in our society. And the computer industry itself chronically suffers from a critical shortage of skilled, thoroughly trained hardware technicians with "hands on" experience on today's minicomputer systems.

Pierce College, a two-year school in California's Los Ang-

es Community College district, has instituted a training program for computer technicians to serve its students, its supporting community and industry.

The Pierce computer technology program is directed toward both high school graduates and current high school students looking toward careers in computer technology and toward teachers of mathematics, science and the liberal arts seeking a greater knowledge of computer science.

The three phases of the pro-

gram are:

- To graduate competent computer technicians with an Associate in Science degree.
- To involve a greater number of high school students in computer technology training and to stimulate interest in and understanding of computers to most students.
- To assist high school teachers interested in computer technology through summer workshops.

The Pierce program extends computer training down to the

secondary school level, as the computer department staff found that the average high school student — the child of the television era and the space age — doesn't have the slightest concept of how a computer works.

Yet they've discovered many students are suddenly "turned on" by the potential a career in computer technology offers. Several students failing in high school prior to enrolling in the precollege computer technology courses have made the dean's list

after enrollment.

High school students who elect to enter the program can take up to one full semester's work at their own schools through the use of logic trainers — small units that teach the student how a computer logically performs its functions. Since the curriculum is the same as that taken by Pierce freshmen, full college credit is given.

Pierce was able to set up its computer technology program through two major grants; the first from IBM, the other from the National Science Foundation (NSF). The NSF funds enabled Pierce to upgrade its equipment and to obtain a Digital Equipment Corp PDP-11/40.

"Bugs" Added

Beside providing students with a thorough understanding of computer theory, the Pierce program offers intensive laboratory instruction where the student troubleshoots "bugs" inserted in the equipment to produce malfunction.

Pierce College's experience in the high schools indicates training in computer technology at the secondary school level can provide a desirable alternative for students who are not motivated by conventional academic subjects, but prefer to work with their hands.

ADC Offering Complete System On One Board

SANTA ANA, Calif. — A complete computer implemented on one 15-1/4 in. by 16 in. board is available from Applied Data Communications (ADC).

The heart of this general-purpose computer is an Intel Corp. 8080. Memory included in the basic system is 4K bytes of random-access memory (RAM) and 1K bytes of reprogrammable read-only memory (ROM).

Terminal communication is provided for teletypewriter, CRT or modem through an asynchronous I/O with speed select from 110 to 9,600 bit/sec. Peripheral communication is provided on two flat ribbon cables. Both direct memory access (DMA) and non-DMA device controllers are accommodated. Also included is a floppy disk controller to interface up to eight drives, the firm said.

Optional peripherals and controllers offered with the system include front-panel console, IBM-Compatible floppy disk, 3M Co. tape cartridge, programmable real-time clock, line printer, character printer, 7-track or 9-track magnetic tape, synchronous/asynchronous communications, general-purpose I/O card and ROM programmer.

Price for the complete CPU card with 4K RAM and 1K programmable read-only memory (Prom) is \$1,300. CPU card in chassis with power supply is \$1,990; including front-panel console the price is \$2,440. The system price of \$4,600 includes CPU, front panel and one IBM-compatible floppy disk.

The firm is at 1509 E. McFadden Ave., 92705.

A DOZEN OIL COMPANIES ARE USING RAYTHEON MINICOMPUTERS ON 6 CONTINENTS. THE WORD'S GETTING AROUND.

the word gets around

RAYTHEON DATA SYSTEMS RAYTHEON

COMPUTER INDUSTRY

In Data Entry/Communications

CI Notes

U.S. Base to Reach \$2.7 Bn by '79

NCR Licenses Mitsubishi

DAYTON, Ohio—NCR Corp. has signed a royalty agreement with Mitsubishi Electric Corp. that gives Mitsubishi exclusive rights to manufacture 1K-bit and 4K-bit metal nitride oxide silicon (MNOS) P-channel memory devices in Japan.

Mitsubishi also gained nonexclusive worldwide marketing rights for the device.

The agreement excluded use of the technology for TV and radio tuning devices because NCR has licensed General Instrument Corp. for worldwide use of the technology in those fields.

NCR will receive initial payment plus royalties on Mitsubishi's sales of the electrically alterable read-only memory (Eaom) devices developed by NCR's microelectronics division. NCR uses the devices in various terminals.

FTC to Collect Shipment Values

WASHINGTON, D.C.—The Federal Trade Commission (FTC) has approved a plan to collect information on the value of shipments by the country's 1,000 largest manufacturers.

The FTC will use the data yielded by the corporate patterns survey to look for possible antitrust violations, evaluate the impact of mergers and note changes in market structure. The FTC last ran such a survey in 1950, and plans to collect similar data in 1977 and 1978.

The effort is distinct from the FTC's push to collect data on profits of major corporations broken down by line of business, which has drawn opposition from several firms.

The FTC said it will not publish data from any individual company before Jan. 1, 1978.

Supershorts

Talks regarding a possible merger between Percec Corp. and Computer Machinery Corp. (CMC) have been terminated, CMC said.

Intel Corp. has named Kenamitsu Electronics Ltd. of Tokyo as its Japanese distributor for add-on memories for the IBM 370/135, 145 and 158.

Boeing Computer Services, Inc. will market A.O. Smith's manufacturing data system in 44 states.

Data Card Corp. has appointed Sietematic as Brazilian representative for printer systems made by its Troy Division.

WALTHAM, Mass.—The number of data entry/communications units in the U.S. should grow at about 15% a year through 1979, bringing the total installed base to about 1.6 million units valued at \$12.7 billion, according to a study from International Data Corp. (IDC).

At year-end 1974, the U.S. installed base of such equipment totaled about 840,500 units valued at \$5.3 billion, the firm said. During 1974, about 160,800 units with a value of \$1.2 billion were shipped.

The most explosive growth will be in

NCR Ships Production Scanners As Stores Adapt to POS Systems

DAYTON, Ohio—As part of its plan for step-by-step implementation of supermarket point-of-sale (POS) systems, NCR Corp. has begun shipment of production-model Universal Product Code (UPC) scanning equipment.

The firm has shipped almost 1,000 computerized supermarket checkout systems, and production shipments of scanners represents the next step in NCR's strategy.

The strategy is based on the desires of the supermarket industry, the degree of implementation of the UPC code, and NCR's experience in installing its first scanning system, according to D.J. McCarthy, NCR vice-president of retail systems marketing.

The strategy consists of four elements, he explained. Among them are thorough testing of pilot scanning systems in live

the area of distributed or clustered processing systems and associated products, the study indicated.

IDC defined a clustered processing system as an intelligent operator-oriented terminal system with disk or diskette, a minicomputer or microcomputer and a telecommunications link to a central computer.

So far, the independents have gained the lion's share of the market, with IBM holding less than a 50% share of the number of installed systems in the combined data entry/communications market

at year-end 1974.

Dividing up the growth by sectors, the figures in IDC's *EDP Industry Report (EDP/IR)* showed distributed keyboards should have a five-year growth factor of 250. The next highest growth rate cited was 7.5 for intelligent terminals; CRTs, both editing and conversational, showed 3.4 growth factor.

Keyboard/printers should grow at the rate of 1.2 and key-to-disk units at 1.3, EDP/IR said.

However, key-to-tape devices and keypunches will have a negative five-year growth factor of 7.7 and 1.4 respectively, IDC said.

Looking at the U.S. keyboard market in 1974, IBM held a 52% market share by number of keystrokes, with independents at 26%, other mainframes at 12% and AT&T at 10%, EDP/IR said.

Breaking out the 1974 revenues of independent manufacturers of keyboards, which totaled \$700 million, the largest share, 32%, went to key-to-disk systems. Intelligent terminals followed at 19%, editing-type units at 18%.

Key-to-tape units held 14% of revenues, and keypunches and conversational printers tied with 8.5% each.

FASB Drafts Lease Accounting

STAMFORD, Conn.—Standards for leveraged leases and increased disclosure by lessors are two of the elements contained in a recent draft on lease accounting issued by the Financial Accounting Standards Board (FASB).

The board also defined what constitutes a capital lease.

Under the FASB proposal, leveraged

leases would be accounted for by the lessor under the "separate phases" method. This method recognizes the separate investment phases that are characteristic of these leases in which the lessor's net investment declines during the early years and rises during the later years.

Leveraged leases were defined as those in which the cost of the leased asset is largely financed through long-term debt that is nonrecourse to the lessor.

The draft may provide an answer to lessors wondering when they can qualify a lease as a sale. For a lessor to categorize a lease as a sales-type lease (if manufacturing or dealer profit is involved), the lease must satisfy a total of three criteria, the draft stipulated.

The probability of collection of lease payments must be "reasonably predictable" and there should be no important uncertainties surrounding the amount of costs still to be incurred by the lessor under the lease.

The third criteria needed by a lessor to capitalize a lease would be any one of the following: if a lease transfers title to the property to the lessee by the end of the lease term; if the lease contains an option to purchase the property at a bargain price; or if the lease term is equal to 75% or more of the estimated economic life of the property.

(Continued on Page 32)

DP Exports Aid Trade Balance

WASHINGTON, D.C.—Computer shipments again helped the business machines category show a positive balance of trade in the first quarter.

U.S. exports of business machines totaled \$670 million, while imports were \$257 million, for a positive trade balance of \$413 million in the quarter, according to figures from the Commerce Department.

Exports of computers and related equipment were valued at \$555.5 million, or 83% of the business machines total. DP imports totaled \$32.5 million.

Although a Commerce spokesman cautioned that year-to-year figures are not directly comparable because some items were reclassified, in the first quarter of 1974 the U.S. exported about \$469.5 million of computers and related equipment.

On a comparable basis, the increase in DP exports over the year-quarter was about 9%, she said.

Breaking down the allocation of shipments, the UK was the largest customer, purchasing U.S. exports valued at \$80.3 million. Canada followed with \$78.5 million, ahead of France with \$62.4 million. West Germany purchased \$61.3 million and Japan bought \$53.6 million.

The quarterly figures on imported computers represented an increase of about 25% over the 1974 quarter. However, parts were included in the export figures but excluded in the import figures, she said.

Imports of DP equipment included \$15.1 million from the European community and \$1.8 million from the Far East.

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Sales of 3000s Twice Those of Last Year, HP Reports

By Molly Upton
Orme Cw Staff

CUPERTINO, Calif. — Sales of the HP 3000 system have doubled over those of last year, according to Ed McCracken, general manager of Hewlett-Packard Co.'s (HP) new General Systems Division, which handles the 3000 and the 2000 Access systems.

HP has started to mount a major marketing program to go after IBM System/3 users seeking upgrades, he said.

As part of its effort to pursue the business/commercial market for the 3000, HP offers seminars, primarily on data base management.

HP discovered many of the attendees at these seminars are from small installations seeking upgrades. The seminars are part of HP's "horizontal campaign to pick up business wherever we can," McCracken said.

Sales to System/3 users have increased

dramatically in the last few months, he added.

Less than 25% of installed 3000s are in the educational arena, and even there the systems are used principally in commercial applications, he said. Cobol, RPG, data base management and image data base management are on those systems, he explained.

In the education market, Fortran has declined dramatically as part of the total mix for HP within the last year, he said, while Cobol and RPG have risen.

"We have several markets we're looking at. The educational market is certainly one, and we're working with third-party software houses with educational administrative software that has been written around our data base management package."

The HP 2000 can be used either as a Lisp workstation or as a time-sharing system.

It has dual processors and is priced less than some single processor systems from other makers, McCracken said.

Within time-sharing, 70% of HP's sales are to the educational market, but the firm is expanding into the industrial field, he said.

New Structure

The new structure at HP, in which two new divisions were created out of the Data Systems Division, allows management to more closely focus on specific areas such as the 3000 and 2000, he said. The move was in keeping with the HP tradition of small, decentralized profit centers, he said.

The two fastest growing areas, terminals and the 3000, were split off, and time-sharing was added to the 3000. The overall orientation is toward business systems compared with Data Systems, which targets the OEM and industrial areas with

the 21MX and industrial units, he said.

HP has no interest in picking up Xerox's Data Systems Division, McCracken said, and the question of picking up part of the business has not been addressed.

NCR Now Shipping Production Scanners

(Continued from Page 31)

ners which can be retrofitted to the broad base of computer-controlled systems already installed as the UPC code becomes widely used.

One of the important findings in the Marsh supermarket test project, installed over a year ago, was the need for step-by-step implementation of computer-controlled checkout, McCarthy said.

"The store found it advantageous to have time to adjust to the completely new system and the new internal procedures involved before converting to scanning" a year later, he said.

"For example, store personnel had to be trained in using the equipment, and new procedures for handling coupons and food stamps had to be implemented, as well as new balancing procedures."

"Most importantly, store management needed time to adopt a new way of looking at its operation. The system provides a whole range of new information which can be used to improve efficiency. Store personnel have to adjust to all these changes and shoppers need time to see how the electronic systems work before scanners are installed," he said.

"If this gradual implementation is followed, there are fewer chances for mistakes and the store can adjust to the new systems with little disruption of its normal business."

Recognizes Caution

The NCR strategy also recognizes the caution with which scanning is being approached by the industry, McCarthy said. Until scanners are fully proven in a large number of stores and are totally accepted by shoppers, the supermarket industry prefers a gradual approach.

"Also, the degree to which the UPC is being implemented is an important factor," he said. "We estimate that between 50% and 60% of all packed dry-goods items and dairy products are now being marked with the code."

Most store operators believe over 80% of supermarket items must be source-marked by the manufacturer before scanners will become economically feasible, he said. This level of source marking is unlikely to be reached until late 1975 or early 1976, he added.

Gradual implementation of scanning also gives supermarkets an opportunity to test shopper reaction to the system.

"At each stage, stores can take surveys of shopper opinion as the changes are made," he said. "In addition, analysis of operating figures measures the impact of the systems on revenues and profits."

One of the important tasks in converting to computerized checkout, McCarthy said, is to gather a large base of information on the systems so stores can formulate policies.

FASB Drafts Proposal On Lease Accounting

(Continued from Page 31)

The other two requirements are if it is estimated that by the end of the lease the property's fair value will be less than 25% of what it was at the beginning or if the property is special-purpose to the lessee.

Lessees would be required to classify a lease as a capital lease (shown as an asset and an obligation on his balance sheet) if it meets any one of the preceding five criteria, the board said.

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Data Communications Course #1010 - Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HDLC, DDS, newly approved major revisions to VHS, and the impact of Satellite Carriers. Total cost, including workbook, reference materials luncheon and continental breakfast is \$350. Additional registrants from the same company qualify for the reduced rate of \$300.

San Diego	Plaza Int'l Hotel	Sept. 29-30
New York	St. Moritz Sheraton	Oct. 13-14
San Francisco	Hyatt Regency	Oct. 20-21
Dallas	Hilton Inn	Nov. 10-11
Miami	Marriott	Nov. 17-18

Data Communications Course #1020 - Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations. Total cost, including an extensive set of customized course materials, is \$450. Additional registrants from the same company qualify for a reduced rate of \$400.

Miami	Holiday Inn Airport Lakes	Dec. 1-3
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Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is \$325. Additional registrants from the same company are charged only \$275.

New York	Summit Hotel	Oct. 22-24
San Francisco	Hyatt Regency	Nov. 12-14
Chicago	Hyatt Regency	Nov. 19-21

How to Draft Effective Legal Agreements

This one-day seminar is a complete workshop for non-legal, technical people who may be called upon to draft legal agreements for their company. Also led by Roy Freed, this seminar covers a variety of formal agreements, their structure and the legal factors involved. You'll have all the basic skills necessary to write legal agreements, and you'll be able to spot items that really require the attention of lawyers.

New York	St. Moritz Sheraton	Oct. 8
Boston		Oct. 15

Data Base Design

Given in association with Leo J. Cohen and Performance Development Corporation, this three-day seminar is a package-independent examination of the techniques required for the design of effective data base systems. The seminar covers Effective Record Design, Physical Storage Techniques, Optimum File Organization/Indexing Techniques, File Integration, and much more. Cost for the seminar, including course materials, continental breakfasts and luncheons is \$350. Additional registrants from the same company qualify for a reduced rate of \$300.

New York	St. Moritz Sheraton	Sept. 22-24
Denver	Denver Hilton	Dec. 1-3

Performance Evaluation and Improvement

Saul Stimler, author of Data Processing Systems: Their performance, evaluation, measurement, and improvement will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Resttime, Batch and interactive time sharing systems. Cost for the seminar, including continental breakfasts and luncheons and all course materials is \$250.

New York	Summit Hotel	Sept. 29-30
Wash., D.C.	Marriott at Wash. Int'l Airport	Oct. 20-21
Chicago	Hyatt Regency	Oct. 27-28
San Francisco	O'Hare	Nov. 19-20
Dallas	Royal Coach	Jan. 19-20

How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of Softech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation, and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is \$300. Additional registrants from the same company are charged only \$250.

New York	St. Moritz Sheraton	Oct. 6-7
San Francisco	Berkeley Marriott	Nov. 10-11



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Low End Expanding Quickly as French DP Sites Grow

By Molly Upton
of the CW staff

LONDON—Computer installations in France are growing at a rapid rate, with much of the expansion coming in the lower end of the market and in terminals, according to figures published by the Commission du Traitement de l'Information (Cotti) and reported in *EDP Europa* (EDP/ER).

As of Jan. 1, the number of computers installed in France had grown 27.7% to 14,195 compared with 11,117 installations a year ago, the report said.

The number of visual record computers installed increased 17.5% to 33,380 compared with 28,415 units in 1974, the

Braegen Seeks Funds

After Calcomp Jilting

SUNNYVALE, Calif.—Braegen Corp. is talking with other sources of possible funding after it was left waiting at the altar when California Computer Corp. (Calcomp) decided not to acquire it [CW, Aug. 27].

The firm, which has shipped about 19 systems, each including a processor and an average of 10 terminals and associated peripherals, is talking with one party regarding refinancing, an officer said.

The financing could be equity, but not necessarily, he said.

Braegen is still in production, he added. The firm remained in its facilities here during its courtship with Calcomp.

A spokesman for Calcomp said it had decided to put its funds into other product areas where there was a more immediate return on investment. He estimated the Braegen enterprise would need two more years to become profitable.

There was no problem obtaining orders for the Braegen product, he added, but there was a question of profitability.

Philips Plans Competition

For IBM System/32 Area

PARIS—Philips has announced plans to manufacture a floppy disk office system in direct competition with IBM's System/32.

The product, designated the P362, will also be competing with Logabax's recently announced LX4500.

The P362 will be built around a P350 computer. The peripherals will include a disk and cassette.

Philips' floppy disk will have a smaller storage capacity than the System/32, according to *Zero Un Informatique*, but nevertheless will be a serious competitor in the field.

Neither a price nor a production date have yet been announced.

Consulting Firm Formed

LOS ANGELES—A management consulting firm, J.K. Sweeney & Co., Inc., with offices here and in Versailles, France, has been organized by James K. Sweeney, founder and chairman of Computer Machinery Corp. The European operations are in association with Groupe Prest.

report said.

Excluding a small section for "other" machines, the process control sector showed the highest rate of growth, 37.8%, and general-purpose systems rose 31.3%.

The number of processors intended only for scientific purposes declined 22% to 177, EDP/ER said.

In the processor area, Cotti figures showed systems with a value of under \$57,500 numbered 3,924 compared with 2,758 a year ago.

The largest number of processors, almost half the installed base in France, fell in the range between \$57,500 and \$322,000. There were 6,466 of these systems installed at the beginning of 1975 compared with 5,596 at the start of 1974.

For systems worth between \$322,000 and \$1.6 million, the base totaled 2,038 units compared with 1,848 last year, the

report said.

There were 624 systems valued between \$1.6 million and \$4.8 million compared with 546 a year ago, according to the report.

The total installed base rose to 13,052 systems compared with 10,748 last year. EDP/ER observed the last set of figures eliminated the largest and smallest systems and those classified as "other."

Terminals Growing Fast

Terminals was a fast-growing peripherals sector, growing from 17,019 units at the beginning of 1974 to 27,163 by 1975.

The number of nonintelligent terminals grew 72.9% to 22,250 from 12,667 while intelligent units climbed 42.4% to 5,913 units from 4,152 units, EDP/ER said.

The use of card punches and single-station data entry units with a magnetic medium fell slightly, the report noted, and was compensated for by the in-

creased use of terminals and a 50% growth in the number of key-to-disk systems installed.

Card punches declined to 49,268 from 52,395 units, and multistation key-to-disk units totaled 961, the report said.

Line printers grew to 17,131 units from the 13,159 units reported on Jan. 1, 1974. Tape cassette units nearly tripled, jumping from 552 to 1,920 units, EDP/ER said.

Fixed-disk drives increased to 1,548 from 1,224 while exchangeable disk drives rose to 15,697 units from 12,881 at the beginning of 1974, the report said.

By application market, management was the largest category with 3,675 systems, up from 3,096 a year ago, while scientific declined to 173 from 223.

Industrial systems grew to 1,852 compared with 1,343, while systems used in "universal" applications grew to 7,352 from 6,086 last year, the report said.

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Increasing Offerings

Centronics Planning Aggressive 1976

By Molly Upton

HUDSON, N.J. — Centronics Data Computer Corp. intends to be as aggressive, if not more so, in 1976 as it was in 1975, Hank Weiss, director of marketing, said.

So far this year, the firm has announced 10 products, he said.

Centronics expects to accommodate rising customer demand for lower cost units and to increase its offerings into the 200- and 300 line/min area, he said.

The market area Centronics is now in — printers with speeds from 88 char./sec. to 200 line/min — will have a good, sustained growth of from 15% to 17% a year, he said. The firm has 16 printers and two teleprinter models.

Much of the effort next year, will be in

finishing up products announced this year, he added. For instance, the firm will be including magnetic tape with its teleprinter Models 308 and 508. The firm is also planning products tailored to specific applications, he said.

Foreign Sales

In addition, sales in Europe and other foreign areas should grow at a rapid rate, he said.

Perhaps Centronics' most eye-catching product this year was the printer with four heads, the 104, introduced in Hannover, W. Germany. But four heads are not the maximum that can be put on a printer, said Ron Huch, vice-president of marketing. The limitation is imposed by space, with room for 11 or 12, he said.

Part of Centronics' key to success is its

management's attitude, which is typified by this year's decision to increase product development and marketing support, Weiss said.

The company was originally planning five products for '75, he said, but increased this to 10 so the firm would be in a better position at the end of the recession.

The marketing force was expanded to increase the customer base and thereby counteracted order volumes. Centronics now has about 350 OEM customers compared with about 300 a year ago, he said.

Total shipments to date are over 50,000 units, Huch said.

One example of how Centronics takes advantage of economies of scale is its use of LSI. This reduces the cost of spare



OP Photos by V. Farmer

Huch

Weiss

parts to the OEM, said Weiss.

Centronics offers a step down decrease within families of products allowing OEM customers to decrease the price of units they purchase after reaching certain milestones in volume.

As an incentive to this plan, Centronics frequently adds similar products in more than one family, such as the 503 and the 103, said Weiss.

Back in 1971, Huch said, Centronics created an image by advertising in the end-user marketplace.

Today part of Centronics' market strength comes from demand by the end user to the OEM for a Centronics printer, Weiss said.

Service, Support

Centronics also has strengthened its service and support areas. It now provides service in more than 50 locations, either direct or third party, and more than 60% is done by Centronics personnel, Huch said.

The firm maintains an on-line diagnostic center, central dispatching of service personnel and a team that trains OEM personnel in receiving, inspection and system checkout.

Centronics has also prepared audiovisual courses for OEM service personnel and runs road shows on updated techniques.

Centronics has matured to the point where 24% of its manufacturing personnel are involved in quality assurance and control, Weiss said. The firm carefully tests and publishes mean time between failure down to the component level and stands by its claims, Huch said.

The firm's on-line diagnostics save time and money for nearly all involved, said Huch. Often a user's seemingly insignificant change in software will show up only when the system is running on-line, he explained.

By using the diagnostics, Centronics can pinpoint whether the trouble is in the printer, the modem, the communications lines or the mainframe, he said.

Centronics is in litigation with Core, its former distributor in Britain and Germany, and has established subsidiaries in England, France and Germany. It has about nine distributors in the rest of Europe, and within 90 days sales to Europe should be up as high as, if not higher than, they were before the dispute with Core, Weiss said.

The firm also has established distributors in South America, South Africa and Australia, he said.

Currently, about 30% of business is outside the U.S., and this should increase by 10% or 15% next year, he said.

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Nixdorf Eager to Challenge S/32 Market With 8870

CHICAGO — "It is not only a pleasure but a wonderful challenge to compete against IBM in this country," Heinz Nixdorf, president of Nixdorf AG, said as he unveiled Nixdorf's multiprogramming/multiterminal entry in the small system field, the 8870.

Nixdorf anticipates keeping the same 50-50 ratio of its installations in both large and small companies as it has with its 3,000 installations of the 800 series, he added. Marketing to larger firms provides a buffer during recessions, he observed.

Nixdorf Computer, Inc.'s revenues in the U.S. should double by 1977 over those of 1975, he added.

Satisfies Vold

The Nixdorf 8870 is designed to satisfy what Nixdorf perceived as a void in the market, a single-source, turnkey system in the small to medium-size machine range, according to Dave Snyder, product manager. First-time users will be a special target group.

Currently there are few firms that provide hardware, software, service and financing for a product the size of the 8870, he said. Generally a user has to go to at least two sources to put a system

together, he said.

The 8870 also will be marketed as an upgrade of billing and accounting machines needing multiprogramming capability and in vertical markets, such as medical, wholesale/distribution and municipalities, Snyder said.

Nixdorf provides standard application packages as well as performing custom programming, he said. The programs are written in Basic.

On-Line Diagnostics

By linking users on-line to a Nixdorf site, programmers can examine a user's application and make necessary changes, Snyder said, since the language is interactive.

Nixdorf can do this because it writes the software and provides the service, so it

knows what is in the system, he said.

The firm has already done maintenance person for every 35 sites, he added.

Snyder said there is a difference between the billing and accounting machine markets and the small systems area. In the billing and accounting machine area, the software is supplied almost exclusively by the hardware vendor, which encourages price cutting on the software portion in order to sell the product.

In small systems, however, the third-party software vendors have "made a market for applications software to a reasonable extent," he said.

"It's amazing the multiprogramming/multiterminal market has developed so quickly without an acknowledged leader," he said.

IBM's projections for its System/32



OP Photo by V. Farmer

Dave Snyder

show the market is "hungry for someone to attack it in logical, professional manner," he said.

Grantee Set to Study Man/Machine Speech

PITTSBURGH, Pa. — Professor D. Raj Reddy of Carnegie-Mellon University has been awarded a fellowship from the John Simon Guggenheim Foundation for the study of man-computer communication.

Reddy has been working on systems which provide a voice answer in response to oral questions from the inquirer. "We now have such systems which are restricted and are capable of only a few hundred words of speech," Reddy said. "The words must be carefully spoken; they must be concerned with very specific tasks and with language carefully tailored to the necessary task."

Reddy will use his grant to do research at laboratories in the U.S., Japan and Europe.

Executive Corner

■ Mark W. Schiedinger has been named vice-president of finance and peripheral products at Control Data Corp.

■ William G. Moore Jr. has been appointed vice-president of U.S. marketing operations at Inforex, Inc.

■ George J. Yoskita has been elected senior vice-president of General Automation, Inc.

■ Edward P. Boyhan has been named vice-president of engineering and program management for Southern Pacific Communications Co.

■ N. David Wheeler has been appointed vice-president of research and engineering at Mohawk Data Sciences Corp.

■ Arnold W. Morrison has been elected to the board of directors of Computer Communications, Inc.

■ Norman C. Lincoln has been appointed vice-president of operations of the Computer Systems Division of Harris Corp.

Logicom Corp. has named Jean-Pierre Denis vice-president and general manager; Sven B. Swendsen, chairman of the board; Leonard A. Ehrig, president; John Sandberg, vice-president of engineering; and Lee Jensen, vice-president and treasurer.

■ Derek Richell has been named vice-president and general manager, and James D. Wylie vice-president of marketing and field operations.

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Richard Middleton and Marilyn Maleckas of HIS with PPS

HIS Exhibits PPS Device For First Time in Public

By a CW Staff Writer

NEW YORK—Honeywell Information Systems' (HIS) New York branch exhibited its Page Printing System (PPS) here at Info '75 last week.

The exhibit marked the first public showing of the system outside of local Honeywell offices. Russ Bishop, product manager, said.

The system was purchased off the floor within the first two hours of the show, he said.

The PPS, which can be run off-line at a constant printing speed of 18,000 line/min, can produce up to 32 collated copies of a report, he said.

The unit is now in full production, and "market response has been really gratifying," Bishop said.

Inquiries at least doubled after IBM announced its high-speed printer system, he said, explaining that Honeywell announced the system about a year ago, and it was such a new concept, people were a little scared.

He said Honeywell is pleased to meet IBM head on in this market, from the standpoint of advantages it offers: deliveries; features; and price, which is about 20% less than IBM. De-

livery is 90 days.

Customer sites are in Boston, Pittsburgh, Dallas, Los Angeles, Akron and Philadelphia, and the one from the floor will be installed within a couple of weeks in New York, he said.

Orders & Installations

General Electric's Information Services Business Division has installed Honeywell's HS4400 computer to provide expanded capabilities for its medium-to-large process control applications.

The State of Washington has ordered Adabas from Software AG. Adabas will be used for a statewide library system and personnel payroll system.

Albertson's, Inc., has converted 13 of its 230 supermarkets to electronic checkout equipment from NCR. The order includes 108 NCR 255 terminals and 13 NCR 726 in-store computers.

Consultants & Designers, Inc., a temporary help agency, has ordered "Micros," a turnkey

In American DP ICL, Olivetti Seeking Market Identity

By Molly Upton
of the CW staff

NEW YORK—International Computers Ltd. (ICL) and Olivetti Corp. exhibited at Info 75 here last week, both seeking to establish a greater identity in the American computer market.

"One of the big obstacles to marketing in the U.S. is people don't think of Olivetti as they ought to," according to Im Zwerfler, national account manager. He added the firm is number two or three worldwide in communications.

"The major problem is letting people know who we are," he said.

Olivetti feels it has two key advantages in selling to the small systems market, he said. It has traditionally marketed turnkey systems and has developed in-house expertise in applications. Zwerfler said.

The Olivetti A5 and A7 are

sold almost exclusively as turnkey systems, he said.

CW at Info 75

Olivetti has 92 district offices in the U.S. and 700 agents, with about 900 service points.

The initial version of the TC 800 will be sold to the banking market, especially thrift institutions, he said, and later to the wholesale, distribution, law enforcement and municipal government markets.

Olivetti makes all of the 800's components with the exception of line printers, he added. The 32K CPU will be expanded to 64K soon, and the 50 char/sec printer will be upgraded to a 330 char/sec dot matrix printer, he said.

The firm will mass production of the 800 at the end of the

year, Zwerfler said. About 1,500 have been sold in Canada, he added.

ICL showed a 2903 at Info to generate leads and convince people of its serious intent in the American market, according to David Crocombe, vice-president of marketing.

The firm, which markets only out of New York City, has achieved about 98% of its goal, with 13 installations out of a target of 15, he said.

Crocombe anticipates an even better year next year, as it now has an established customer base for references, he said.

Most of its installations are in the distribution and manufacturing area, he said.

A year ago ICL announced it was looking for a partnership venture in the U.S., he observed.

An analysis of the U.S. market is expected within a month, when decisions will be made whether to expand product offerings and locations in the U.S., he said.

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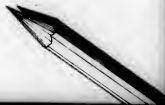
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LOOK AT THESE SAVINGS ON NEW 370 MEMORY <table border="1"> <thead> <tr> <th></th> <th>IBM Rental</th> <th>36 Month FMA Rental</th> <th>48 Month FMA Rental</th> <th>60 Month FMA Rental</th> </tr> </thead> <tbody> <tr> <td>370/145 Memory</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>From 256K to 512K</td> <td>\$ 3,170</td> <td>\$1,953</td> <td>\$1,564</td> <td>\$1,344</td> </tr> <tr> <td>From 512K to 768K</td> <td>2,680</td> <td>2,115</td> <td>1,739</td> <td>1,512</td> </tr> <tr> <td>From 768K to 1024K</td> <td>5,260</td> <td>3,600</td> <td>2,986</td> <td>2,444</td> </tr> <tr> <td>From 1024K to 2048K</td> <td>11,210</td> <td>6,412</td> <td>5,214</td> <td>4,404</td> </tr> <tr> <td>370/158 Memory</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>From 1.0 (Mb) to 2.0 (Mb)</td> <td>\$ 5,720</td> <td>\$4,436</td> <td>\$3,624</td> <td>\$3,061</td> </tr> <tr> <td>From 1.5 (Mb) to 3.0 (Mb)</td> <td>9,670</td> <td>6,197</td> <td>5,068</td> <td>4,272</td> </tr> <tr> <td>From 2.0 (Mb) to 3.0 (Mb)</td> <td>6,810</td> <td>4,542</td> <td>3,938</td> <td>3,364</td> </tr> <tr> <td>From 1 (Mb) to 2.0 (Mb) 158-3*</td> <td>9,720</td> <td>6,317</td> <td>6,829</td> <td>5,704</td> </tr> <tr> <td>From 2 (Mb) to 3.0 (Mb) 158-3*</td> <td>10,810</td> <td>8,516</td> <td>6,823</td> <td>5,962</td> </tr> </tbody> </table> *Lease prices include memory and CPU upgrade to 370/158 Model 3 • YOUR CHOICE OF MANUFACTURER... SHORT TERM LEASES... SAVE UP TO 50%. • LEASE PRICES INCLUDE SHIPPING & INSTALLATION, NOT MAINTENANCE, TAXES OR INSURANCE. • SIMPLE LEASE DOCUMENTATION... 360 IBM & OEM MEMORY AVAILABLE.		IBM Rental	36 Month FMA Rental	48 Month FMA Rental	60 Month FMA Rental	370/145 Memory					From 256K to 512K	\$ 3,170	\$1,953	\$1,564	\$1,344	From 512K to 768K	2,680	2,115	1,739	1,512	From 768K to 1024K	5,260	3,600	2,986	2,444	From 1024K to 2048K	11,210	6,412	5,214	4,404	370/158 Memory					From 1.0 (Mb) to 2.0 (Mb)	\$ 5,720	\$4,436	\$3,624	\$3,061	From 1.5 (Mb) to 3.0 (Mb)	9,670	6,197	5,068	4,272	From 2.0 (Mb) to 3.0 (Mb)	6,810	4,542	3,938	3,364	From 1 (Mb) to 2.0 (Mb) 158-3*	9,720	6,317	6,829	5,704	From 2 (Mb) to 3.0 (Mb) 158-3*	10,810	8,516	6,823	5,962	IBM 360/40 Ready For Delivery No.
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Despite Revenue Rise

Quarter Earnings Dip at Ampex

REDWOOD CITY, Calif. — Revenues increased in the first quarter at Ampex Corp., as did pretax operating income. However, earnings declined because of the \$13 million settlement paid by IBM last year.

Revenues for the period rose to \$63.7 million compared with \$61.3 million in the year-ago period.

Income from continuing operations before special credits rose 23% to \$2 million compared with \$1.6 million a year ago.

Earnings for the period were \$1.6 million or 14 cents a share compared with \$1.1 million or \$1.21 a share in the same period last year.

Debt Shrinks

Debt was reduced \$11 million in the first quarter.

At the shareholders' annual meeting, Chairman Richard J. Elkus observed many of the goals planned for completion over a five-year period have been obtained after the third year of the "new Ampex." This acceleration, he said, should have a positive effect on the future.

The firm's disk product line has benefited from a shift in emphasis to OEM marketing. "Our fourth quarter generated the highest quarterly booking order for OEM disk products in the company's history," said

President Arthur H. Hausman. Ampex is currently discussing its Terabit mass memory systems with a number of large OEM computer systems manufacturers both in the U.S. and abroad, he said.

International Nearly Half

Over the past 3-1/2 years, Ampex has reduced debt more than 50% to \$124 million from \$253 million.

International business has grown from 27% to 45% of the firm's total volume.

Two-thirds of the company's

sales last year were attributable to products less than five years old, he said, observing the company's potential for growth is considerable.

Ampex's sales of magnetic tape have increased almost 60% in the last three years, he added, and last year international sales of magnetic tape products increased 40% over the year before.

During fiscal 1975, Ampex sales of magnetic tape totaled \$54 million or 22% of sales, Hausman said.

STC Proceeds to Increase Lease Base As Six-Month Income, Revenues Climb

LOUISVILLE, Colo. — Along with increased earnings and revenues for the second quarter and six months, Storage Technology Corp. (STC) proceeded apace with its plan to increase its own lease base rather than selling to third-party lessees.

For the second quarter, total revenues of \$20.8 million compared with \$18.1 million in the year-ago period. The sales portion rose to \$12.9 million compared with almost \$11.9 million in the same 1974 quarter, while

rental and service revenues grew to \$7.9 million from \$6.2 million in the same quarter last year.

Quarterly earnings for the period ended June 27 totaled \$1.4 million or 36 cents a share compared with \$1.2 million or 33 cents a share in the year-ago period.

Revenues Rose

During the six months, revenues increased to \$60.3 million compared with \$34.3 million in the 1974 half. The sales portion rose to \$25.1 million from \$22.7 million, while rental and service income grew to \$15.2 million compared with \$11.7 million in the same period last year.

Earnings totaled \$2.7 million or 69 cents a share compared

with \$2.4 million or 63 cents a share in the half year. The 1974 earnings per share have been adjusted to reflect a 5% stock dividend in the first quarter.

STC will show the major portion of its \$12.2 million sale of tape drives to the Social Security Administration during the third quarter.

In keeping with its plans to increase its own lease base, the firm has added \$8.9 million of gross rental equipment to its balance sheet. STC's current plans require no additional bank borrowings over those available, the firm said.

Production is up about 65% for the first half compared with that of 1974, the firm said.

ICL Six-Month Results Rise 21% Volume of Orders Received Up 19%

LONDON — International Computers Ltd.'s (ICL) six-month results rose 21% over the same period last year, while the volume of orders received rose about 19%. Two-thirds of the increase in orders was attributable to a price increase of 12%, Computer Weekly said.

Revenues totaled nearly \$240 million in the half year ended March 31, while pretax before taxes rose 22% to \$15.3 million, aided by a smaller loss from Computer Leasing, its finance subsidiary.

For 1974, the subsidiary lost about \$4.1 million whereas for the six months, the loss totaled \$138,240, the paper said. ICL's overseas business accounts for about 46% of total orders, which is about the same percentage as in the year-ago

period, but ahead of the 41% for the full year 1974.

The firm increased its borrowings to about \$40.2 million from \$10.2 million in the year-ago period, which is well within the limit of \$73.4 million, the report said.

GCC Half-Year Net Slips

PHOENIX — Greyhound Computer Corp.'s (GCC) second-quarter and six-month earnings dipped sharply from year-ago figures.

The declines were primarily attributable to unfavorable first-half data services results, President Olie E. Swanky said. For the quarter ended June 30, the firm's earnings dipped to \$91,000 or 2 cents a share compared with \$308,000 or 7 cents a share in the year-ago period.

Revenues grew to \$15.3 million compared with \$13.7 million.

During the six months, earnings dropped to \$140,000 or 3 cents a share compared with \$746,000 or 17 cents a share in the year-ago period.

Revenues grew to \$31.2 million in the six months compared with \$26.5 million in the same period last year.

The continuing decline in computer leasing revenue levels was approximately offset by the contribution of the new subsidiary, Computer Leasing Co., and slightly lower than average short-term interest rates, Swanky said.

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Contracts

Ampex Corp. has received a \$1 million contract from Singer Business Machines to supply TMB tape drives and DE-835 phase-encoded formatters for Singer's System Ten.

On-Line Systems, Inc. has been awarded a five-year computer services contract from Dynabac Corp.

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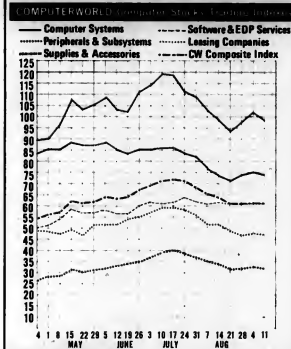
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Earnings Reports

CDMSHARE			DIDMED			APPLIED DATA RESEARCH		
Six Months Ended June 30			Six Months Ended June 30			Three Months Ended June 30		
Shr	1974	1975	Shr	1974	1975	Shr	1974	1975
Trd Crd	\$1.10	\$1.13	Trd Crd	\$656.10	\$2.25	Shr Earnings	1.10	1.10
Revenue	12,318,390	12,500,000	Revenue	747,610	747,610	Revenue	3,291,410	2,218,410
Net Income	1,444,000	709,000	Net Income	1,470	1,470	Disc Op	6,444,000	6,444,000
2 Mo Sh	1,444,000	709,000	2 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
3 Mo Sh	1,444,000	709,000	3 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
4 Mo Sh	1,444,000	709,000	4 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
5 Mo Sh	1,444,000	709,000	5 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
6 Mo Sh	1,444,000	709,000	6 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
7 Mo Sh	1,444,000	709,000	7 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
8 Mo Sh	1,444,000	709,000	8 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
9 Mo Sh	1,444,000	709,000	9 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
10 Mo Sh	1,444,000	709,000	10 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
11 Mo Sh	1,444,000	709,000	11 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
12 Mo Sh	1,444,000	709,000	12 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
13 Mo Sh	1,444,000	709,000	13 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
14 Mo Sh	1,444,000	709,000	14 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
15 Mo Sh	1,444,000	709,000	15 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
16 Mo Sh	1,444,000	709,000	16 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
17 Mo Sh	1,444,000	709,000	17 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
18 Mo Sh	1,444,000	709,000	18 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
19 Mo Sh	1,444,000	709,000	19 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
20 Mo Sh	1,444,000	709,000	20 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
21 Mo Sh	1,444,000	709,000	21 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
22 Mo Sh	1,444,000	709,000	22 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
23 Mo Sh	1,444,000	709,000	23 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
24 Mo Sh	1,444,000	709,000	24 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
25 Mo Sh	1,444,000	709,000	25 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
26 Mo Sh	1,444,000	709,000	26 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
27 Mo Sh	1,444,000	709,000	27 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
28 Mo Sh	1,444,000	709,000	28 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
29 Mo Sh	1,444,000	709,000	29 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
30 Mo Sh	1,444,000	709,000	30 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
31 Mo Sh	1,444,000	709,000	31 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
32 Mo Sh	1,444,000	709,000	32 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
33 Mo Sh	1,444,000	709,000	33 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
34 Mo Sh	1,444,000	709,000	34 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
35 Mo Sh	1,444,000	709,000	35 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
36 Mo Sh	1,444,000	709,000	36 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
37 Mo Sh	1,444,000	709,000	37 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
38 Mo Sh	1,444,000	709,000	38 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
39 Mo Sh	1,444,000	709,000	39 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
40 Mo Sh	1,444,000	709,000	40 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
41 Mo Sh	1,444,000	709,000	41 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
42 Mo Sh	1,444,000	709,000	42 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
43 Mo Sh	1,444,000	709,000	43 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
44 Mo Sh	1,444,000	709,000	44 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
45 Mo Sh	1,444,000	709,000	45 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
46 Mo Sh	1,444,000	709,000	46 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
47 Mo Sh	1,444,000	709,000	47 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
48 Mo Sh	1,444,000	709,000	48 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
49 Mo Sh	1,444,000	709,000	49 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
50 Mo Sh	1,444,000	709,000	50 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
51 Mo Sh	1,444,000	709,000	51 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
52 Mo Sh	1,444,000	709,000	52 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
53 Mo Sh	1,444,000	709,000	53 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
54 Mo Sh	1,444,000	709,000	54 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
55 Mo Sh	1,444,000	709,000	55 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
56 Mo Sh	1,444,000	709,000	56 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
57 Mo Sh	1,444,000	709,000	57 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
58 Mo Sh	1,444,000	709,000	58 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
59 Mo Sh	1,444,000	709,000	59 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
60 Mo Sh	1,444,000	709,000	60 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
61 Mo Sh	1,444,000	709,000	61 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
62 Mo Sh	1,444,000	709,000	62 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
63 Mo Sh	1,444,000	709,000	63 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
64 Mo Sh	1,444,000	709,000	64 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
65 Mo Sh	1,444,000	709,000	65 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
66 Mo Sh	1,444,000	709,000	66 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
67 Mo Sh	1,444,000	709,000	67 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
68 Mo Sh	1,444,000	709,000	68 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
69 Mo Sh	1,444,000	709,000	69 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
70 Mo Sh	1,444,000	709,000	70 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
71 Mo Sh	1,444,000	709,000	71 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
72 Mo Sh	1,444,000	709,000	72 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
73 Mo Sh	1,444,000	709,000	73 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
74 Mo Sh	1,444,000	709,000	74 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
75 Mo Sh	1,444,000	709,000	75 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
76 Mo Sh	1,444,000	709,000	76 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
77 Mo Sh	1,444,000	709,000	77 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
78 Mo Sh	1,444,000	709,000	78 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
79 Mo Sh	1,444,000	709,000	79 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
80 Mo Sh	1,444,000	709,000	80 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
81 Mo Sh	1,444,000	709,000	81 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
82 Mo Sh	1,444,000	709,000	82 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
83 Mo Sh	1,444,000	709,000	83 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
84 Mo Sh	1,444,000	709,000	84 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
85 Mo Sh	1,444,000	709,000	85 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
86 Mo Sh	1,444,000	709,000	86 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
87 Mo Sh	1,444,000	709,000	87 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
88 Mo Sh	1,444,000	709,000	88 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
89 Mo Sh	1,444,000	709,000	89 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
90 Mo Sh	1,444,000	709,000	90 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
91 Mo Sh	1,444,000	709,000	91 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
92 Mo Sh	1,444,000	709,000	92 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
93 Mo Sh	1,444,000	709,000	93 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
94 Mo Sh	1,444,000	709,000	94 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
95 Mo Sh	1,444,000	709,000	95 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
96 Mo Sh	1,444,000	709,000	96 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
97 Mo Sh	1,444,000	709,000	97 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
98 Mo Sh	1,444,000	709,000	98 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
99 Mo Sh	1,444,000	709,000	99 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
100 Mo Sh	1,444,000	709,000	100 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
101 Mo Sh	1,444,000	709,000	101 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
102 Mo Sh	1,444,000	709,000	102 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
103 Mo Sh	1,444,000	709,000	103 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
104 Mo Sh	1,444,000	709,000	104 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
105 Mo Sh	1,444,000	709,000	105 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
106 Mo Sh	1,444,000	709,000	106 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
107 Mo Sh	1,444,000	709,000	107 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
108 Mo Sh	1,444,000	709,000	108 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
109 Mo Sh	1,444,000	709,000	109 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
110 Mo Sh	1,444,000	709,000	110 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
111 Mo Sh	1,444,000	709,000	111 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
112 Mo Sh	1,444,000	709,000	112 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
113 Mo Sh	1,444,000	709,000	113 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
114 Mo Sh	1,444,000	709,000	114 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
115 Mo Sh	1,444,000	709,000	115 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
116 Mo Sh	1,444,000	709,000	116 Mo Sh	(1,470)	(1,470)	Disc Op	6,444,000	6,444,000
117 Mo Sh	1,444,000	709,000	117 Mo Sh	(1,470)	(1			



	1975	1974
Shr Ernd	\$1.27	\$1
Revenue	16,424,815	15,260,1
Tax Crd		36,5
Earnings	598,299	915,3
9 Mo Shr	4.72	4
Revenue	47,984,325	39,328,2
Tax Crd	5,000	102,0
Earnings	2,219,454	2,276,5

TEXAS INSTRUMENTS		
Three Months Ended June 30		
	1975	1974
Shr Ernd	\$.49	\$1
Revenue	330,961,000	403,386,000
Earnings	11,295,000	25,229,000
6 Mo Shr	1.10	2
Revenue	663,718,000	778,000,000
Earnings	25,287,000	49,081,000

TYMSHARE			
Three Months Ended June 30			
	1975	1974	
Shr Ernd	\$ 30	\$	
Revenue	13,959,376	11,383,4	
Tax Cred	25,000	35,0	
Earnings	1,140,947	791,1	
6 Mo Shr	.61		
Revenue	27,994,322	22,596,4	
Tax Cred	125,000	121,6	
Earnings	2,326,213	1,580,0	

TAB PRODUCTS			
Year ended May 31			
	1975	1974	1973
Shr Ernd	\$1.63	\$1.63	\$1.63
Revenue	35,824,000	26,712,000	26,712,000
Earnings	1,358,000	867,000	867,000
3 Mo Shr	.28	.28	.28
Revenue	8,631,000	7,746,000	7,746,000
Earnings	230,000	307,000	307,000

Computerworld
Sales Offices

Vice President – Marketing <i>Nail Weider</i>	Western Regional Manager: <i>Bill Healey</i>
Sales Administrator: <i>Corie Travis</i>	1212 Healey Bldg. San Francisco, Calif. 94103 Phone: (415) 495-0909
COMPUTERWORLD 797 Washington Street Newton, Mass. 02160 Phone: (617) 965-5800 Telex: USA-92-2529	Japan: <i>Toshio Kasuya</i> General Manager Dempa/Computerworld 1-11-15 Higashi Gotokuji Shinjuku-Ku, Tokyo 161 Phone: (03) 445-6110 Telex: Japan-26792
Northern Regional Manager <i>Mike Burman</i> COMPUTERWORLD 797 Washington Street Newton, Mass. 02160 Phone: (617) 965-5800 Telex: USA-92-2529	United Kingdom: <i>Michael Young</i> Computerworld Publishing Ltd 140-146 Camden Street London NW1 0PF, England Phone: (01) 485-2365 Telex: UK-26-47-37
Eastern Regional Manager <i>Donald E. Fagan</i> Account Manager <i>Frank Gallo</i> COMPUTERWORLD 2150 Center Avenue Fort Lee, N.J. 07024 Phone: (201) 461-2575	West Germany: <i>Otnar Wehr</i> Computerworld GmbH 8000 Munich 40 Tristanstrasse 11 West Germany Phone: (089) 38-40-36 Telex: W.Ger.5-21350-HKFD

Computerworld Stock Trading Summary

PRICE						PRICE						PRICE							
	1973	CLOS	WEEK	WEEK			1973	CLOS	WEEK	WEEK			1973	CLOS	WEEK	WEEK			
	111	1973	CHANGE	CHANGE		111	1973	CHANGE	CHANGE		111	1973	CHANGE	CHANGE		111	1973	CHANGE	CHANGE
COMPUTER SYSTEMS																			
A	ARMSTRONG CORP	21-27	3	3/4	-4-1														
C	COMPUTER AUTOMATION	2-10	8	3/8	0-0														
C	COMPUTER SYSTEMS	2-10	8	3/8	0-0														
N	CATA GENERAL CORP	10-38	27	1/8	-1/78	-4-0													
N	CATA TECHNOLOGY INC	10-38	27	1/8	-1/78	-4-0													
C	ORIGINAL CORP CONTROL	1-1	3	1/8	-1/4	-1-1													
C	DATA EQUIPMENT INC	2-1	3	1/8	-1/4	-1-1													
C	ELECTRONIC ASSOC	2-1	3	1/8	-1/4	-1-1													
C	FORWARD	23-47	26	1/4	-3/78	-12-9													
C	GRI AUTOMATION CORP	1-1	3	1/8	-1/4	-1-1													
C	HANSON CORP	20-40	29	1/2	-1/4	-1-1													
C	HETWELL INC	22-40	29	1/2	-1/4	-1-1													
C	HENDERSON	0-1	7	1/4	-3/4	-4-0													
C	MODULAR COMPUTER SYS	9-12	12	1/4	-1/4	-2-0													
C	PC	2-9	34	3/4	-1/4	-4-0													
C	PCME COMPUTER INC	2-9	3	1/4	-4-7	-4-0													
N	PERKINS-BERKE	18-30	26	1/2	-2-0	-2-0													
N	RAYSON CORP	24-39	33	1/4	-1/4	-2-0													
N	SINGER COMPUTER	10-11	12	3/8	-1/8	-1-0													
N	STANLEY	37-48	37	1/8	-1/8	-2-0													
N	STIVERS ENCL LARS	1-3	3	1/4	-1/4	-2-0													
N	TECHNICAL TRADING INC	1-3	3	1/4	-1/4	-2-0													
N	VARIAN ASSOCIATES	7-14	13	1/2	-7/8	-4-0													
N	VERMILION	1-3	3	1/4	-1/4	-2-0													
N	WERNER CORP	31-80	52	1/4	-3/8	-8-1													
LEASING COMPANIES																			
C	CONSOLEC INC	1-3	3	1/4	0-3/8	-3-7													
C	CONTRACTOR GROUP CORP	1-2	5	1/2	0-0	-9-1													
C	COMPUTER INVESTMENT GRP	1-2	5	1/2	0-0	-9-1													
C	DATA EQUIPMENT INC	1-2	5	1/2	0-0	-9-1													
C	DATA INC	1-2	5	1/2	0-0	-9-1													
C	DATA SERVICES	1-2	5	1/2	0-0	-9-1													
C	GRANITE INC	1-2	5	1/2	0-0	-9-1													
C	INTEGRATED COMPUTER	1-2	5	1/2	0-0	-9-1													
C	ITEL	1-2	5	1/2	0-0	-9-1													
C	LEASAC CORP	1-2	5	1/2	0-0	-9-1													
C	LEASAC CORP	1-2	5	1/2	0-0	-9-1													
C	MLC INC	1-2	5	1/2	0-0	-9-1													
C	MODULAR COMPUTER	1-2	5	1/2	0-0	-9-1													
C	MODULAR COMPUTER	1-2	5	1/2	0-0	-9-1													
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C	MODULAR COMPUTER	1-2	5	1/2	0-0	-9-1													
C	MODULAR COMPUTER	1-2	5	1/2	0-0	-9-1													
C	MODULAR COMPUTER	1-2	5	1															

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